AUTOMOTIVE INDUSTRIES

MAY 15, 1953

MATERIALS HANDLING SHOW NUMBER

AUTOMOTIVE and AVIATION MANUFACTURING
CIVILIAN AND DEFENSE

ENGINEERING . PRODUCTION . MANAGEMENT

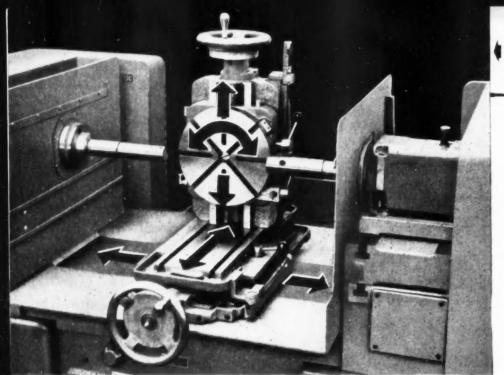
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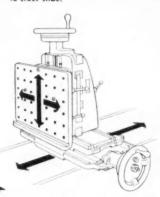
Equipment at MH Show · · · · Automation Problems

· · · · Soviet Vehicle Industry · · · · German Cars



Heald Universal Fixture with rotary indexing face plate permits borizing from both ends on this Heald Model 322 Bore-Matic

Heald Universal Fixture with rotary indexing face plate mounted parallel to cross slide.



Heald Universal Fixture with rectangular face plate mounted parallel to cross slide.

Here's why the Heald

UNIVERSAL FIXTURE

gives MAXIMUM VERSATILITY for small-lot borizing

• The accuracy, finish and economy of Heald Borizing is not limited to long-run jobs with special, custom-built fixtures and tooling. A standard machine, equipped with a Universal Fixture, offers maximum versatility for small-lot borizing on a wide range of miscellaneous parts.

This time-saving Universal Fixture permits indexing of work or tools horizontally, vertically or angularly. Multiple surfaces can be bored, faced or turned with "jig-borer" precision at a single set-up.

The vertical and horizontal slides can be equipped with calibrated handwheels, gage blocks and integral dial indi-

cators for maximum precision of fixture adjustment. This cuts set-up time, speeds change-overs, and permits exact duplication of settings for repeat jobs.

Two styles of Universal Fixture are available - with either a rotary indexing face plate or fixed rectangular face plate for holding the work, tools or auxiliary fixtures. With either type, the face plate can be mounted parallel to the machine table ways or parallel to the cross slide travel. Universal Fixtures are more usually applied to models 221, 321, and 421 (single-end) Heald Bore-Matics. Double-end setups on the two larger size models 322 and 422 have proved successful where circumstances permit.

Ask your Heald representative for complete details on this Universal Fixture. Or write for your copy of Bulletin No. 7-25-1. Remember - when it comes to precision finishing, it pays to come to Heald.

INTERNAL AND ROTARY SURFACE GRINDING MACHINES AND BORE-MATICS

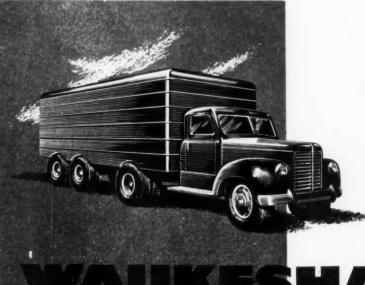
Case Study No. 2239-96 in

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MACHINE COMPANY

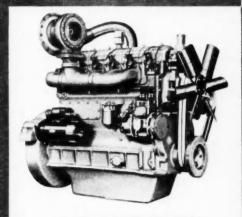
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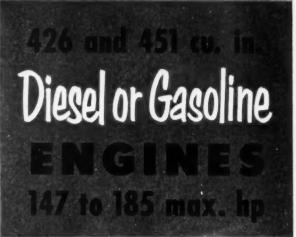


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135-DKBS-TURBOCHARGED DIESEL Maximum hp 185 @ 2800 rpm.

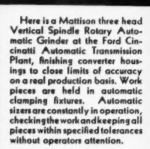


213



• Versatile and rugged — Waukesha Model 135 Engines are ideal for almost any transport service in their speed and power range. The gasoline versions are 426 and 451 cubic inch displacement, with updraft or downdraft carburetion. The 135 Diesels are 426 cubic inch, either normal or turbocharged. Counterbalanced crankshafts, aluminum pistons, full pressure oiling—every modern feature! Exceptionally rugged, but smooth and lively, with no unnecessary weight. For medium speed and industrial service these engines are available with standard crankshafts. Send for bulletins.

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MAY 15, 1953

VOL. 108, NO. 10

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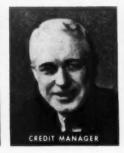




















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POLYKEN TAPE

cuts water damage claims more than 50%



Polyken Tape No. 215 seals the doors of this Carolina trailer. Application is fast, inexpensive and sure...tested protection against water damage to cargo in transit.

One of the most effective ways to cut down intransit water damage and reduce the number of costly claims is to seal trailer doors with tape. And take the word of Carolina Freight Carriers Corporation, Cherryville, North Carolina, for this—there isn't a tape in the field that can do the job as well as Polyken Tape No. 215.

After a lot of experimenting, this company tells you Polyken No. 215 has "all the necessary qualities incorporated into one tape." It is a strong, inexpensive, weatherproof cloth tape which, because of its excellent tack, can be quickly applied. Superior adhesion makes it hold in spite of vibration, wind, rain and snow. The proof: after using Polyken Tape No. 215 on trailer doors for six months, claims resulting from water damage have been cut more than 50%.

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SUNICUT 110-S for heavy duty service in broaching, threading,
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All four oils keep parts and tools cooler, help maintain closer work tolerances, permit longer runs between tool dressings. All are odorless and light in color. In addition, Sunicut 11-S and 209-S have high lubricating value and are nonstaining.

For your copies of the technical bulletins describing these new oils, call the nearest Sun office or write Sun OIL COMPANY, Philadelphia 3, Pa., Dept. AA-5.



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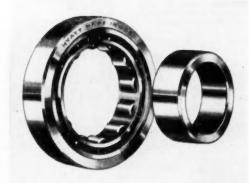


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The value of a heavy-duty truck depends on its ability to "stand up" under the big loads-to take a maximum of punishment with a minimum of maintenance. And that's why Hyatt Roller Bearings have long been the top choice of leading truck manufacturers-for Hyatts are engineered and built for the big loads! In differentials, rear wheels, pinions, transmissions, steering gears and other vital positions, Hyatt Roller Bearings are performanceproved to have longer life at peak efficiencyreducing costs as they reduce friction. If you aren't already profiting through the use of Hyatts, investigate the advantages of Hyatt Hy-Load and Hyatt Spherangular Roller Bearings for all automotive applications. Write to Hyatt Bearings Division, General Motors Corporation, Detroit, Michigan.

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ROLLER BEARINGS





Exploded view slewing new air cleaner with removable filter elements. These easily removable discs can be taken out, serviced and replaced with a minimum of effort and time.

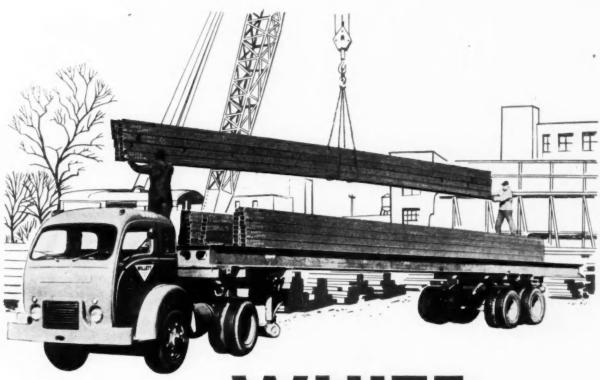
Pre-Cleaner

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AIR CLEANERS . METAL STAMPINGS . ROLLED SHAPES IGNITION AND TURN SIGNAL SWITCHES . DOVETAILS



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▶ Good start on a difficult job is pictured above ... with White Model 3022PLT providing the stamina and endurance to successfully transport heavy steel rails. Among other outstanding features of this White unit are new maneuverability...safety...and the finest in Steering—Ross.

For nearly a half century Ross has anticipated and met the ever-changing needs of the automotive industry for easier, safer, more economical steering.

Maximum steering ease and stability, in just the *right* combination...parking ease...minimum wear... simplicity and speed in any needed adjustment... sturdy, rugged construction...all these are distinguishing characteristics of Ross Cam & Lever Steering.

And for the steering jobs that are extra tough, Ross has developed Hydrapower—hydraulic power steering at its best. We invite discussion of any steering problem.

Cam & Lever STEERING

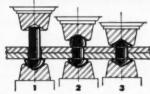
ROSS GEAR AND TOOL COMPANY . LAFAYETTE, INDIANA





STRONGER JOINTS!

This "silent squeeze" method gives you (1) rapid advance to riveting position, (2) high-pressure shaping of the rivet, cold or hot, and (3) automatic reversal as soon as the rivet is formed. Why are these rivets stronger? Because with this method the rivet shank ex-



pands to completely fill the hole and, as the metal flows to shape the heads, fillets are formed under both heads. The rivet is workhardened, too, and every rivet is uniform.

FASTER RIVETING!



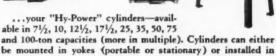
Yes! From the time the button is touched it takes only 2½ seconds to head a ¾ rivet. "Hy-Power" is safe, too!
For the stroke can be interrupted and the ram reversed automatically anywhere in the cycle, simply by releasing the control button.

QUIETER OPERATION!

Here's the power source for this modern riveting method . . . it's the Hannifin "Hy-Power" Generator. This compact unit is a combination of motor, pump, oil reservoir, automatic control valves and high pressure intensifier that quietly supplies hydraulic pressure to...







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Get Bulletin 150. Learn why cost-conscious firms in many fields use "Hy-Power." Just write for your copy of this 32-page book. We'll mail it promptly.



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Air and Hydraulic Cylinders • Hydraulic Presses • Pneumatic Presses • "Hy-Power" Hydraulics • Air Control Valves



Front Side of Tooling Area

Rear Side of Tooling Area

The "automatic" has substantiated many of the advantages of centralized responsibility in metal turning.

Even the earlier users realized that more work pieces can be profitably placed in one basket if nothing upsets the basket. Dependable performance has always been vital to the successful use of the "automatic".

The factors that determine the degree of dependability of an "automatic" are a very important part of its specifications. They are a part of the complete information available on CONOMATICS.

In producing the above part on a 1%"-SIX, the cycle time of 14 seconds per piece is not as important as the total time necessary for the entire run. Dependable performance pays.

A Comparison of ALL Automatics is in Favor of Cone



Conomatic Cone automatic Machine company, Inc. windsor, vt., u.s.a.



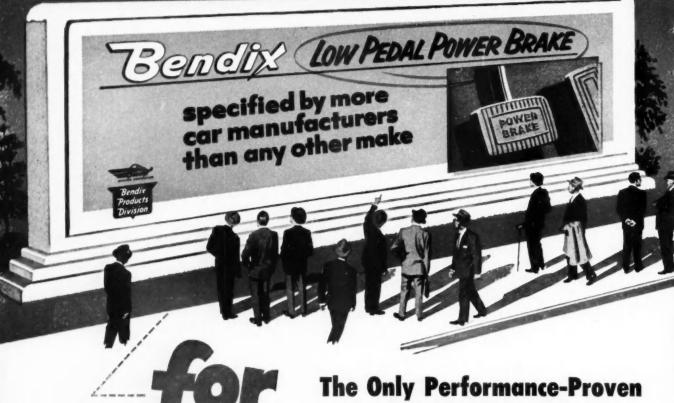
•With welded tubing you can cut weight without sacrificing strength. That's because —for a given strength in all directions—a tubular shape weighs less than any other structural section.

If you're interested in weight saving (and dollar saving), write Brainard Steel Division, Dept. W-5, Griswold Street, Warren, Ohio. An integrated producer; offices throughout the U.S.



WELDED STEEL TUBING

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Now Stopping IS AS EASY AS accelerating



power pressure to bring your car to a stop. With the Bendix Low Pedal Power Broke on about the same level as the accelerator, an easy ankle movement, much like working the accelerator, is all the physical effort required for braking. And by morely privating the feet on the heel, shifts from "go" to "stop" controls are

Regult: MORE DRIVING COMPORT, LESS PATIGUE AND GREATER SAFETY.

Low Pedal Power Brake

Car manufacturers, here is a sure answer to the problem of creating added interest in your line of cars. Equip your vehicles with Bendix* Low Pedal Power Brake, the sales feature that has already established itself as one of the most popular devices offered the public in years.

Dealers are enthusiastic because with the Bendix Low Pedal Power Brake it is now easy to demonstrate added braking power and safety. Service managers are happy because of its trouble-free performance and, best of all, new car buyers realize that with today's trend toward "power" operation, a car equipped with a Bendix Low Pedal Power Brake offers the ultimate in braking efficiency.

Remember, too, this new low pedal power brake is the product of Bendix, world's largest producer of power brakes and leader in braking develop. ments since the earliest days of the industry. That's why if you are contemplating power braking it will pay to "Sign Up" with Bendix for the greatest improvement in braking since four wheel brakes. *REG. U.S. PAY. OFF.

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High Spots of This Issue

★ Largest Materials Handling Exposition

Panoramic is the word to describe this year's Materials Handling Show with 300 or so companies exhibiting a wealth of mechanical handling equipment, much of it new, from conveyor systems to industrial trucks. See Pages 32 and 60.

★ Conveyor Lines Facilitate Powerglide Operations

The Chevrolet-Cleveland plant has been highly mechanized and conveyorized. Featured in this article is the maze of conveyor systems in the Powerglide assembly department. Other parts of the plant are covered also. Page 34.

* Radio-Controlled Industrial Trucks Expedite Handling

The Electric Storage Battery Co. has taken a progressive step in equipping a third of the fork lift trucks in its Philadelphia plant with radio. The author tells how these units are directed to wherever needed. Page 38.

* Mile-Long Body Conveyor System

Pride of the Studebaker plant in South Bend, Ind., is a mammoth conveyor system for transporting bodies from floor to floor. The system replaces truck trailers formerly used. Complete specifications are given. Page 40.

* Automation Problems Analyzed at Machine Tool Forum

Interest in automation has become so intense in the automotive industries that the recent Westinghouse Machine Tool Electrification Forum was indeed lively. Extracts from several papers presented are printed. Page 46.

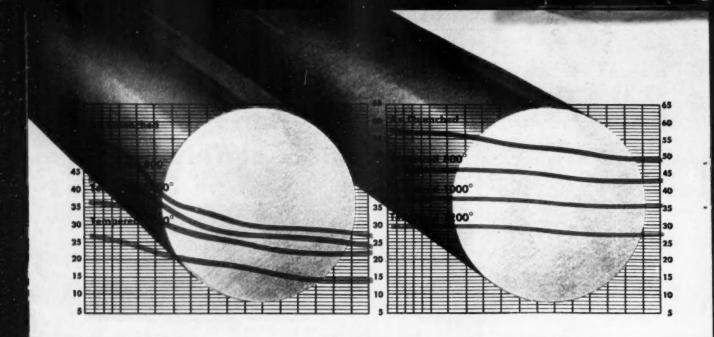
★ 66 New Product Items And Other High Spots, Such As:

The great mistake of Karl Marx; new turnover fixture for large truck chassis; potentialities of automation discussed at conveyor meeting; new German cars at huge Frankfurt Show; Soviet automobile industry expanded and partially modernized; a survey of Canada's aviation industry; close control of all variables in heat treating landing gear struts; latest features of the Pneumatractor; versatile tooling for making torsion bars; SAE aeronautic meeting features production forum; lead-backed masking tape solves special plating problems; and needed—an evaluation of fork lift trucks.

Automotive and Aviation News, Page 17 Complete Table of Contents, Page 3

AUTOMOTIVE INDUSTRIES COVERS

PASSENCER CARS - TRUCKS - BUSES - AIRCRAFT - TRACTORS - ENGINES - BODIES - TRAILERS - ROAD MACHINERY - PARM MACHINERY - PARTS AND COMPONENTS - ACCESSORIES - PRODUCTION EQUIPMENT - SERVICE SOUIPMENT - MAINTENANCE SOUIPMENT - PRODUCTION - MANAGEMENT - PRODUCTION - MANAGEMENT



Same Alloy...but What a Difference!

Graphic Reason for Using Ryerson Certified Alloy Steel

Here are two bars of alloy steel recently purchased by a metalworking company. Both are the same type of alloy—AISI TS 4140 annealed. And both are high quality steels with chemistry meeting all the requirements of the specification.

But look at the difference revealed by hardenability tests!

The tempered-at-800° curves are typical. For the bar at left this curve starts at 44 Rockwell C and ends at 24. For the bar at right the same curve starts at 45—ends at 42. And the differences in hardenability naturally reflect equally marked differences in the mechanical properties that can be obtained from each bar.

Yet remember both bars are the same alloy and therefore are often expected to react in the same way. Their differences are only the normal variations that occur between different heats within the same specification.

That's why it is so important for you to specify and buy Ryerson Certified Alloys. Every heat of as-rolled and annealed alloy steel from Ryerson has been tested for hardenability in our own laboratory. When you receive a shipment of Ryerson alloys you also receive a Ryerson Alloy Certificate which shows exactly how your particular heat of steel responded to those tests. And the Certificate interprets the test results for you in terms of mechanical properties.

Thus you know the actual—not just the theoretical—hardenability of your alloy steel from

Ryerson. And you know exactly how to heat treat that steel to obtain the desired properties. So why guess at hardenability? Use Certified Ryerson Alloys and be sure.



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Zews of the AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 108, No. 10

May 15, 1953

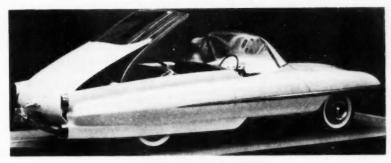
New Twist Considered in Horsepower Race

Things are getting a bit thick in the horsepower race. The two horns of the dilemma are: competitive sales and advertising pressures for prestige position in the high horsepower field, and mounting criticism of higher horsepower from safety, legislative, and other groups. One company is mulling a plan to straddle the issue by leaving advertised horsepower pretty much as is but offering a kit at optional cost to bring the engine up to one of the highest horsepower ratings in the industry. That way, onus would be on the buyer to specify the extra power, leaving the company's skirts clean.

Packard Net, Sales Triple Year Ago

Packard Motor Car Co. under its new management is making an excellent profit showing. For the first three months of this year both sales and earnings were approximately triple those for the same period a year ago. Net profit climbed to more than \$3.5 million compared with \$1.28 million in the first three months of 1952. Earnings before taxes were more than \$10 million, the highest quarterly pre-tax earnings in Packard's history, including the war years. Sales for the three months period also exhibited a substantial rise to more than \$123.6 million compared with \$43.8 million a year ago. About 31,-000 cars were produced, 60 per cent being Clippers.

Currently, Packard management is about equally divided between new personnel brought in by James J. Nance and production and engineering executives who are veterans of the company. Mr. Nance introduced publicly the new line of limousines in New York late last month, and a spokesman said production for the year is sold out.



STEEL TOP DISAPPEARS

This three-eighths scale model shows a possible future hardtop convertible sedan. Ford stylists provided full sedan width in the rear seat, ample luggage space, and a rear window which also serves as a rear windshield when required.

Ford Previews Anniversary Celebration

At a press preview last week, Ford Motor Co. began the observance of its 50th anniversary, which occurs on June 16. The company Archives were dedicated on May 7 and opened to the public some five million papers of the late Henry Ford.

Details of a new \$11 million Styling Building, fourth in a series at the company's \$80 million Engineering and Research Center, were given. The L-shaped structure will have 40,000 sq ft on two floors for styling and design, located in the front wing which faces cooling ponds for air-conditioning the building. The studio wing with 250,000 sq ft will have 12 studios

for full-size model work, and additional studios for interior styling. There will be a rotunda showroom and display garden.

The center will be dedicated on May 20. When completed in 1958 it will cover a 750-acre tract, including the original area occupied by Ford's central engineering organization. Major units in that area are the Engineering Administration Building and Annex, Body Engineering Building, Engineering Research Building and Vehicles Testing Building.

E. S. MacPherson, vice-presidentengineering, said future buildings are already under consideration.

Activity Noted in Costly Accessories

An air-conditioning unit will be offered on the Lincoln beginning in June. Later it will possibly be extended to Mercury also. The air-conditioning system is one developed in cooperation with Novi Equipment Co.

More automobile companies are getting ready to jump on the power steering bandwagon. Mercury announced its linkage booster type last week, with a suggested retail price of \$140. Those with definite plans to adopt it soon are Ford, Kaiser-Frazer, Hudson, and Dodge. Not all will use the same make unit but all will be of the linkage booster power assist type which mounts under the car and connects to the steering linkage. One of the companies now using an integral type is redesigning the unit to make it more compact, simpler, and lower in cost.

One of the larger brake manufacturers soon will come out with an accessory package for equipping late model cars with power brakes.

News of the AUTOMOTIVE





SPRING INTRODUCTIONS

Chrysler Custom Imperial Newport on 1311/2-in. wheelbase is being shown as the latest addition to the Chrysler line.

Kaiser Carolina, \$146 less than Deluxe club sedan, has turn signal and oil bath air cleaner, and full range of options.

GM 1st Quarter Sales Highest in History

General Motors is well on its way toward fulfilling the prediction of Harlow H. Curtice, president, that sales this year will set an all-time record of more than \$9 billion. Sales during the first quarter of this year amounted to \$2.547 billion, a new record. Net earnings totaled \$151 million, but even if projected through the year would not mean a new record, since the company had earnings of more than \$834 million in 1950.

A little more than 20 per cent of GM sales currently is represented by defense work. Earnings as percentage of net sales was 5.9 per cent in the first quarter, a little lower percentage than GM has been earning on the average during recent years. Taxes again took a huge bite totaling \$346 million, or more than double the amount of net income.

Tooling Setback Hits Studebaker Earnings

Because of unusual production difficulties encountered with tools and dies incident to changing over to a new model, Studebaker has reported a net loss of \$984,489 for the first quarter of this year. The troubles had been largely cleared up by March, however, and the company currently is operating at approximately full capacity. Despite the initial difficulties in getting started, Studebaker plans to build 350,000 vehicles this year for an all-time record, according to H. S. Vance, president. Defense work for the first three months enabled Stude-

baker to increase its sales over the same period a year ago to \$162.4 million from \$149.8 million.

Fisher Body to Build Engineering Center

Fisher Body Div. will consolidate its engineering activities in a new center to be built on a 192-acre site adjoining the General Motors Technical Center just north of Detroit. Construction of three buildings with a combined floor area of more than 1.3 million sq ft will make possible centering the Fisher engineering group in one location for the first time. The division's general offices also will move to the new center from the GM building when the project is completed about a year from this fall. Cost of the Fisher center is estimated at about \$40 million. It will be completely air-conditioned and, in keeping with the campus-like atmosphere of the GM Center, will face on an artificial lake.

Hydra-Matic Popular for Light Trucks

The GMC Truck and Coach Div. announced it has sharply increased its production schedules of Hydra-Matic trucks. While GMC Hydra-Matic truck production for February, March and April has averaged 13 per cent of GMC light truck output, dealer demands for this option, currently over 20 per cent, indicates a near future production rate of 25 to 30 per cent for Hydra-Matic models, according to Philip J. Monaghan, general manager of the division.

Quinn Succeeds Wallace as Chrysler Div. Head

In accordance with its retirement program, Chrysler Corp. on Apr. 30 announced the retirement of three veteran leaders.

Herman L. Weckler, vice-president and general manager of the corporation for the past 12 years, entered the automobile industry in 1912 when W. P. Chyrsler called him to Buick. He was general manager when he switched to Chrysler in 1932, as assistant to K. T. Keller. He became director of industrial relations, general manager of DeSoto, and during World War II was president of Dodge.

David A. Wallace, president of the Chrysler Div. for 16 years, also entered the industry from a locomotive company through Buick, as did Weckler and Chrysler. Following various positions on the fringe of the industry, he joined Chrysler Corp. in 1929 as master mechanic, then vice-president of Chrysler Div., becoming president in 1937.

Joseph A. O'Malley, vice-president and general sales manager of Chrysler Div. since 1948, joined the corporation in 1934 in sales, becoming head of two factory branches, and vice-president of the marine and industrial divisions in 1942.

Successor to Wallace is E. C. Quinn, vice-president and general manager of Chrysler Div. Other promotions in the corporation include a new member of the executive staff, I. T. O'Brien. Fred J. Lamborn, vice-president and general manager of the Dodge Div., is now also special consultant to president L. L. Colbert.

AUTOMOTIVE INDUSTRIES, May 15, 1953

AND AVIATION INDUSTRIES

Michigan Firms Get New Defense Orders

Although most of the headlines recently have been given over to reductions in military contracts, new defense orders still are coming into the automotive industry. During March the Detroit Ordnance District parceled out more than \$162 million worth of awards to the automotive and related industries in Michigan. Largest order was a supplementary contract to GMC Truck & Coach Div. for 21/2-ton 6x6 trucks totaling nearly \$96 million. The company also received an \$8 million order for parts. Chrysler Corp. was given a contract totaling more than \$29.4 million for 34-ton trucks. Other orders include: Pontiac, more than \$4.9 million for 40 mm guns; Oldsmobile, more than \$2.53 million for rocket assemblies and tank guns; King-Seeley Corp., \$4.98 million for fuses; Kelsey-Hayes, \$1.67 million for artillery shells; and Continental Motors, more than \$1 million for tank parts. The balance of the \$162 million was assigned to several other companies on either new or extended contracts.

BULL MOOSE

A prime mover and scraper operator, this 25-ton unit was developed by Allis-Chalmers for the Engineer Corps. A 300-hp Cumins Diesel drives through a torque converter and semi-automatic transmission to each side, where front and rear wheels are geared together. All wheels can steer.



Some I-H Prices Fall

Up to 10 per cent reduction in the retail prices of its light, medium, and light-heavy duty R-line models of motor trucks, which it recently introduced, has just been announced by the International Harvester Co. The price reductions cover the company's R-110,

120, 130, 150, 160, 170, and 180-model series, ranging from its smallest pick-up trucks through those of the 19,500-lb rated capacity.

The downward price adjustments range from 3.5 per cent on the R-180 series to 10.6 per cent on the R-120 pickup models. They range from a minimum of \$87 to a maximum of \$152 on former list prices. The overall price reduction in these weight categories amounts to about 6.7 per cent.

In a statement accompanying price reduction announcement, president John L. McCaffrey said I-H is planning increased production at its Springfield, O., plant and other Harvester plants, where these lighter trucks and components are built.

Chrysler Buys Large Tract

There is considerable speculation about reasons behind a purchase by Chrysler Corp. of a 600-acre site about 30 miles northwest of Detroit. The company says that it bought the land as a good investment even though there are no early plans for its use.

earlier this year, will not take a post in the new concern but will remain as financial vice-president of Willys Overland, Inc., which reportedly will become an investment firm. Other directors in Willys Motors will be Brouwer McIntyre of Monroe Auto Equipment Co.; William E. Paris, a

(Turn to page 162, please)

Kaiser-Frazer Absorbs Willys As New Subsidiary

A new name has been added to the roster of automotive companies although in effect no new plant facilities or products are involved. Willys Motors, Inc., now is the corporate name over the physical assets of Willys-Overland Motors, Inc., and Kaiser Manufacturing Corp., wholly owned Kaiser-Frazer Corp. subsidiary.

As had been expected, Willys-Overland stockholders voted overwhelmingly (98.1 per cent) to sell the assets to Kaiser Manufacturing for a sum estimated at about \$62.3 million. Initial payment was \$27 million in cash with \$5.79 million more to be paid in a few weeks. In addition, Kaiser assumes Willys liabilities of nearly \$30 million. The transaction was a highly complex one involving an estimated 800 documents and a total of more than 54,000 signatures plus hundreds of telephone calls involved in transferring millions of

dollars. Behind the acquisition lie several other complicated financial deals under which the Bank of America makes available \$20 million, Henry J. Kaiser Co. \$37.6 million and Transamerica Corp. \$15 million under varying arrangements. These include bank loans, purchase of income notes, sales of Class A preferred stock in Kaiser Manufacturing and of K-F common shares.

Officers Named

Edgar F. Kaiser, K-F president who has been president of Kaiser Mfg., will be the new president and a director of Willys Motors, Inc. Ray R. Rausch will be executive vice president and a director. He formerly was a vice president and executive assistant to Ward M. Canaday, president of Willys, who was invited to head the new company but has declined. John W. Snyder, formerly Secretary of the Treasury, who joined Willys

Lews of the AUTOMOTIVE



EASY TO CLEAN

In this spray booth in large eastern automobile assembly plant filtered heated air enters from an overhead plenum, passes around the body and out through expanded metal floor grating, made by Wheeling gating Co. Eight different colors can be painted at once, as it is claimed there is no possibility of mixture deposit on the wrong car.

Plans to build another engine plant at Cleveland adjacent to its current engine plant and foundry there have been announced by Ford Motor Co. The company is negotiating for purchase of a 142-acre site on which to build the plant. The current foundry at Cleveland has adequate capacity to supply castings for both the present engine plant and the proposed new unit; it has a capacity of 1400 tons of castings a day. Size of the new engine plant was not revealed but will be announced later.

Two New Plants

Set for Ford

Ford also is planning to build a new assembly plant at Louisville, Ky., where it already has an assembly operation. The new unit will have about one million sq ft of floor space and capacity of 1100 cars daily compared with an area of 300,496 sq ft and capacity of 370 cars in the current plant there. Cost is estimated at approximately \$40 million. Trucks also will be produced at the new assembly plant, construction of which will start in about two months. Ford estimates that it will take two to three years to complete the project. It will be of one-story construction with indoor facilities for loading and unloading trucks and railroad cars.

Land was being acquired last week in Bergen County, N. J., by the Erie Railroad, reportedly for a Ford assembly plant.

Snyder, Thomas Named to Chrysler Board

Carl J. Snyder and C. B. Thomas have been elected to the Chrysler Corp. board of directors. They succeed Carl Breer and Herman L. Weckler, who have retired from the board. Mr. Breer retired from the company in 1949 but since that time has served as an engineering consultant. Mr. Weckler also retired from Chrysler on April 30 of this year. Mr. Snyder is vice-president and operating manager of Chrysler and has been associated with the company since 1921. Mr. Thomas also is a Chrysler vice-president and heads the Chrysler Export Div. He joined the company in 1937.

LeTourneau May Be Sold

A general agreement was reached late last month covering the purchase by Westinghouse Air Brake Co. of the earth-moving, tractor and related business of R. G. LeTourneau, Inc., its international sales and distribution organization and its Peoria, Ill., and Toccoa, Ga., plants, R. G. Le-Tourneau, president of LeTourneau, and Edward O. Boshell, president of Westinghouse, announced.

The LeTourneau company will retain and continue to operate the Vicksburg, Miss., and Longview, Tex., plants and manufacture special products for the Government, land clearing equipment, cranes and other products not related to earth-moving.

However, Mr. LeTourneau will continue his development and research work in this field for the new owners.

The agreement is subject to necessary corporate action and the solution of several legal and technical problems. It is contemplated that a new subsidiary to be called LeTourneau-Westinghouse Co. will be organized by Air Brake to take over the earth-moving operations.

Reo Earnings Show Gain Over 1952

Reo Motors, Inc., continues to show a healthy increase in sales and earnings. For the first three months of this year Reo had a net profit of \$802,123 on sales exceeding \$40 million. During the same quarter a year ago earnings were \$690,000 on sales of \$37.2 million. An interesting note in the report is that provision for taxes totals \$2 million, or 21/2 times earnings for the quarter.

B-W Sales and Net at Record Level

Borg-Warner Corp. reports higher sales and greater earnings before taxes during the first three months of this year than in any other similar period in the company's history. Net income after taxes was \$6.34 million on sales of nearly \$114 million. During the same period a year ago income was more than \$5.3 million on sales of \$89.6 million.

Canada Buys More Cars

Canadians spent \$1,002,615,841 for 400,777 new passenger cars and trucks during 1952, according to compilations of the Canadian government's Dominion Bureau of Statistics, Ottawa. This was 4 per cent greater in number of vehicles and 6 per cent greater in dollar volume than in 1951. New passenger cars sold totaled 292,095 at retail value of \$725,167,630. Commercial trucks and cars sold totaled 108,682 valued at \$277,448,211. Of total new passenger cars 124,879 valued at \$194,422,171 were sold in financed sales. A total of 375,825 used passenger cars were bought during the year on the instalment plan for \$283,068,782.

AND AVIATION INDUSTRIES

Television May Aid Jet Engine Testing

Pratt & Whitney Aircraft Div. reports it is experimenting with industrial television to view gas-turbine engine and their components while on test.

The camera now used measures 12 by 14 in., and will carry a distortion-free picture as far as 1000 ft over ¼-in. coaxial cable. The best lighting to date has been obtained by using banks of flourescent tubes.

At present, only one camera is used, but if tests prove conclusive, P&WA may use batteries of cameras on traversing mounts beside the engine.

Magnaflux Open House

Latest expansion of Magnaflux Corp. was revealed at an open house announcement on May 2. Guests were shown through the new 74,000 sq ft main plant located at 7300 Lawrence Ave., Chicago, Ill. The facility is to be used both for manufacturing and for research and engineering. Its 250 employees produce inspection devices for metallic and non-metallic parts, including ultrasonic and electronic testing tools to measure thickness, hardness, and alloy content.

Radio at Proving Ground

Complete two-way radio telephone systems are now in use at General Motors Proving Grounds near Milford, Mich. Two separate systems are provided: a mobile system to provide communication between vehicles undergoing tests, and a fixed system located at various points in the test area. The mobile equipment includes four portable two-way radio sets which can be operated either with ear phones and hand-held microphones or with handsets similar to telephone equipment. The permanent system comprises nine receivertransmitters housed in weatherproof boxes which are automatically put in operation when the door is opened. The equipment is expected to save considerable time in case of mechanical trouble, accidents, and in relaying test information.

Allis-Chalmers Profit

Allis-Chalmers Corp. reports first quarter net income of slightly more than \$4.8 million, a slight decrease from the \$5.2 million earned in the same period a year ago. Sales during the first quarter also showed a decline to \$117.3 million from \$123 million in the first quarter a year ago.

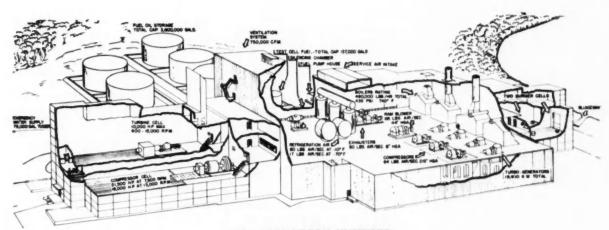
Ford Considers New Addition to Line

Ford has definite plans for another car in its line but is very vague about where it will fall. Most frequent guess is that it will be the Lincoln Continental which has been out of production for several years. However, there is some conjecture that a new model also might be introduced further down the price line. Ford is well aware of the success Chevrolet is enjoying with its premium priced Bel Air line and is thinking about something to meet it.

S. K. Wellman Moves

The S. K. Wellman Co., manufacturers of Velvetouch all-metal friction products, has now completed the move into its new Bedford, O., plant, according to a recent announcement. In this present location is centralized all of the equipment formerly housed in three separate plants and warehouses, plus improved production machinery to accommodate a greatly expanded manufacturing schedule.

Modern in every respect, the new Wellman plant incorporates over 100,-000 sq ft of factory area. An additional 95,000 sq ft is devoted to engeneering laboratory and office space.



JET LABORATORY UNVEILED

Here is the first comprehensive view of Pratt & Whitney Aircraft's Andrew Willgoos Turbine Laboratory, said to be the most complete company-owned experimental jet engine laboratory in this country or abroad. Testing of complete turbojet, turboprop and

ramjet engines, as well as their components, can be carried out in the laboratory, which is located on the Connecticut River at E. Hartford. The laboratory uses water from the river for cooling, at up to 160,000 gpm. Altitude simulation reaches 55,000 ft.

Mews of the AUTOMOTIVE





COMMERCIAL OFFERINGS

Two new helicopters recently entered the commercial transport picture. The McCullough MC-4, left, has received certification, may now be sold. The two- or three-place, 200-hp ship features wide og travel and a simple wee-belt transmission. Doman Helicopters announced its first production model flew late last month. The

YH-31, military version, right, is on production schedule of four per month by 1954. Features include four-blade hingeless rotor, full-floating-type suspension for minimum vibration and stress, pressure oil system. Infinite-life certification is applied for. With 400-hp Lycoming engine with jet cooling, useful load will be over 2000 lb.

Clark Buys Firms in Earth-Moving Field

Clark Equipment Co. has formally acquired all the capital stock of the Ross Carrier Co. of Benton Harbor, Mich. Michigan Power Shovel Co., a subsidiary of Ross, is included in the transfer, which consisted of an exchange of stock.

Production and administration of both new units will be integrated with activities of the Clark organization. Ross Carrier's manufacturing operations in their present locations will be continued.

Clark thus adds power shovels, cranes, draglines and related equipment to its line of materials-handling industrial trucks. It promises some interesting new developments in its new market of earth-moving and construction.

New Spring Plant

Chevrolet Div. will build a new spring and bumper plant at Livonia, Mich., about 15 miles west of Detroit. The new plant will be an expansion of the division's total spring and bumper capacity and will cover 750,000 sq ft. It will be located on a 130-acre site and will be the 27th of Chevrolet's manufacturing and assembly plants. It is scheduled to start production about a year from now.

Carboloy Prices Fall

Price reductions on a major portion of its standard die line were announced by the Carboloy Dept. of General Electric Co., Detroit. Most sizes were reduced by at least 10 per cent. However, some of the more commonly used sizes received even greater reduction.

New Bearing Plant

Ground will be broken in May for a major expansion program at the Timken Roller Bearing Co. plant, Bucyrus, O. Three new buildings will be erected at a cost estimated at \$1.25 million. Maintenance, repair, electrical and sheet metal departments will be housed in a new toolroom measuring 200x100 ft, to which will be attached a 60x100 ft office building. New machinery and production equipment will be installed, and the project will be completed in 1954.

ASBE Annual Meeting

The American Society of Body Engineers will hold its 1953 Technical Convention at the Rackham Memorial Building in Detroit Oct. 28, 29 and 30. The program will consist of eight technical sessions on latest developments and trends in automobile body styling, materials, and production engineering. Also, the customary exhibit of displays by leading suppliers and parts manufacturers will be held in connection with the meeting.

The Buda Co, has completed new plant facilities to increase production of its line of fork lift trucks.

L-M Adopts New Type Weatherproof Zipper

Lincoln-Mercury Div. has adopted an automatic sealing zipper, originally developed as a military item, to seal out moisture around detachable plastic rear windows on its 1953 convertibles.

A pair of rubber lips fold over the metal teeth of the zipper to seal out air and water and prevent wicking of moisture through the fabric top. Not only are fabricating costs reduced and appearance much neater, but protective flaps around windows previously required to protect conventional zippers are eliminated, according to Ford engineers.

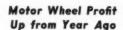
Tractor Overdrive

Caterpillar Tractor Co. has developed an overdrive for its DW-20 fourwheeled tractors, available as a factory-installed option or for equipping units now operating in the field. Tractors equipped with the overdrive now can attain speeds up to 34 mph on units equipped with the 15.75 to 1 final drive reduction, an increase of 8 mph. Mounted on tractors with 21 to 1 drive reduction it increases top speed to 25 mph from 20 mph. The unit was designed and built by Caterpillar for mounting between the engine and transmission and is controlled by manually operated shift lever. Installation requires a special transmission front cover, a clutch shaft and a universal joint, which are supplied as part of the accessory package for field installations.

AND AVIATION INDUSTRIES

Chemicals Div. for Mich. Tool Co.

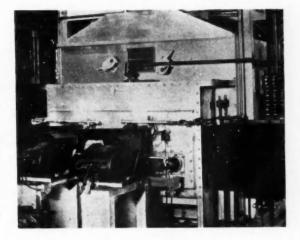
Michigan Tool Co. of Detroit announces the formation of a separate division to manufacture and market a line of industrial chemical products which have been under development at the company for the past several years. The new division will be known as the Shear-Speed Chemical Products Div. Headquarters and sales offices will be located at 7125 E. Mc-Nichols Rd., Detroit 12. A factory building in Detroit has been acquired and installation of equipment is under way. Larry A. Bard has been named manager of the new Shear-Speed Chemical Products Div.



Motor Wheel Corp. reports net earnings of \$798,813 for the first three months of this year, an increase of nearly \$60,000 over the same period a year ago. Sales during the period were the largest for any quarter in history, totaling more than \$23.9 million and 33.8 per cent ahead of the comparable period a year ago.

Coast Firms Receive Orders

Solar Aircraft Co. has received orders totaling more than \$6 million to build parts for two jet engines. Orders are from Ford Motor Co. for components of the J-57 turbojet en-



SAVES ON GAS

Small parts are carburised, oil quenched,
washed and drawn on
production basis at the
Ford Mound Rd. plant.
Surface Combustion rotary retort furnaces
are inter-connected by
screw conveyors.
Charge end of furnace
is shown with vibratory
teeders which handle
over 380 lb per net
hour.

gine, and from Allison Div. of General Motors, for parts for the J-71 engine. Work on both contracts will be done in Solar's Des Moines, Iowa, plants. The Wakonda plant there will be enlarged by a \$2 million, 216,000 sq ft addition.

Solar will supply major assemblies for the two engines, including parts made of high alloy metals, and afterburners.

Hall-Scott Motor Div. of ACF-Brill Motors Co., has received an order from Army Ordnance for 225 of its Model 440 engines, the total order amounting to over \$1.1 million. An order for approximately \$4.5 million in 105 mm gun recoil mechanisms and ammunition has also been received by the division. The mechanisms will

require the installation of special manufacturing equipment. The mechanisms account for \$3,688,000 of the \$4,455,000 order for Army Ordnance.

Another order, amounting to \$370,-000, was received by ACF-Brill to manufacture special trailers to house specialized electronic equipment for Federal Telephone and Radio Corp. The trailers will be built at ACF-Brill's Philadelphia plant.

Brazil Plans Curbs on Car Assembly

The government of Brazil is considering more restrictive regulations on importation of motor cars in hopes of increasing automobile production there. Ford and General Motors already have assembly plants there but if new restrictions are adopted may be required to build manufacturing units to supply components.

Suggested regulations provide that after July 1 only motors and frames would be allowed to enter the country already mounted. Other assembly must be done within Brazil, including upholstering with locally made fabrics. After next Jan. 1 components made outside the country could not be used in assembly operations if similar parts are available from Brazilian manufacturers. Also, an increase in the duty on imported vehicles is under consideration along with an outright ban on importation of components when similar parts are manufactured within the country.

1953 MOTOR VEHICLE F	ACIOKI	SALES.
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	Danasana			To	tale
	Passenger Cars	Trucks	Buses	1953	1952
January February March	486.071	111,599 96,740 134,129	254 190 236	585,172 583,001 700,685	375,410 435,216 482,973
Total-Three Months	1,505,710	342,468	680	1,848,858	1,293,599

1953 MOTOR TRUCK FACTORY SALES BY G.V.W.*

	5,000 lb. and less	5,001- 10,000	10,001- 14,000	14,001- 16,000	16,001- 19,500	19,501- 26,000	Over 26,000	Total
January February	53,077 45,121 59,951	21,481 18,279 25,153	4,067 3,413 6,156	16,333 13,305 22,962	3,950 4,287 5,618	8,766 8,255 9,503	3,905 4,080 4,783	111,599 96,740 134,129
Total - 3 Mos. 1953 Total - 3 Mos. 1952	158,149 110,205	64,913 55,398	13,659 18,022	52,600 70,034	13,855 17,209	28,524 28,384	12,768 13,589	342,468 312,841

^{*-}Automobile Manufacturers Association.

News of the Industry

General Tire to Sell Mansfield Holdings

General Tire & Rubber Co. is planning to dispose of its entire stockholdings in Mansfield Tire & Rubber Co. General holds 237,600 shares of the outstanding Mansfield stock, or about 43 per cent.

The management of Mansfield is reported to be planning to buy about 49,000 of the General shares, with the remaining 200,000 shares to be offered to the public. General is planning to use the capital realized from the stock sale for expansion in its chemical activities and related fields.

Federal-Fawick Reports Loss for First Year

Federal-Fawick Corp., which was formed last year from Federal Motor Truck Co. and Fawick Airflex Co. of Cleveland, shows a net loss of more than \$1.17 million in its first annual report for the year ended last December 31. Net sales last year amounted to slightly more than \$13.5 million.

During 1951, the last full year before absorption into the merged corporation, Federal Motor Truck had net earnings of \$227,906 on sales totaling more than \$20.8 million.

Wilson Donates GM Stock to Hospital

C. E. Wilson, Secretary of Defense and former president of General Motors, donated 1500 shares of General Motors stock to Harper Hospital in Detroit in disposing of his GM holdings. The endowment, estimated at \$100,000, will be used to finance research in the field of medicine with special emphasis on cardiovascular disease.

Bosch Pump in France

Announcement has just been made of an agreement reached between American Bosch Corp., and La Précision Mécanique and Société Industrielle Général de Mécanique Appliquée (S.I.G.M.A.) both of Paris, France, whereby the latter two companies are jointly licensed to manufacture and sell the American Bosch Type PSB single-plunger, multi-cylinder Diesel fuel injection pump.

Bedford Goes Diesel

Bedford, the truck branch of General Motors controlled Vauxhall Motors Ltd., has switched to Diesels for a full range of trucks from 2200 lb to five tons load capacity. Perkins engines are used and arrangements for servicing these have been made both by Bedford and the Perkins organizations. Some changes have had to be made in the chassis layout to accommodate the higher torque compared with that of the gasoline engine. Side rails are heavier, fuel tanks have been increased in capacity, a bigger diameter clutch is used, the Eaton two-speed axles are optional, and springs have been lengthened. Gasoline trucks are being continued.

(Turn to page 218, please)

White Motor Co.—Edward Gray has been named assistant to Karl A. Roesch, general manager, coach and aircraft division. Three vice-presidents have been elected to the board of directors: J. Nevin Bauman, sales; V. W. Fries, manufacturing; Edward S. Reddig, finance. J. A. Kiggen, Jr., was advanced to export manager.

Dodge Div., Chrysler Corp.—Ray Ayer has been named passenger car merchandising manager.



Aluminum Industries, Inc. — John W. Craig was elected president, a board member and general manager of the Cincinnati, O., plants. He was formerly with Avco as manager of the Crosley Div.



Woodhill Chemical Co.—Victor Gelb has joined the firm as sales promotion manager.

Ethyl Corp.—R. J. Ostrander is now assistant director of technical services. Gerald Stanke fills the newly-created position of assistant research supervisor for motor vehicle operations.

Gar Wood Industries, Inc.—Wray Kephart is now Wayne Div. purchasing agent.

Ford Motor Co.—Elbert K. Pollard is now assistant plant manager of the Buffalo assembly plant.

Prewitt Aircraft Co.—C. Hart Miller, former president of Piasecki, was elected to the board and will become an adviser.

U. S. Rubber Co.—Harold M. Winton fills the new post of sales development manager for the mechanical goods division.

Pratt & Whitney Aircraft Div., United Aircraft Corp.—Bert J. Mc-Namara was named purchasing manager recently.

Thompson Products, Inc.—Eben H. Jones is the firm's new secretary and senior legal counsel, replacing W. H. Chamberlain, whose resignation becomes effective July 1.

1953 U. S. PASSENGER CAR PRODUCTION

(As reported by the car factories)

	Anril	March	April	Four	Months
Chrysler	1953 16,748	1953 17,029	1952 11,685	1953 67,085	1952 43,608
De Sote	13,541	13,506	8,438	47,600	32,764
Dodge	30,832	28.534	24,726	120.954	86,318
Plymouth	57,280	58,278	46,006	218,015	157,587
Total - Chrysler Group	118,401	117,347	90,857	453,654	320,277
Ford	96,319	91,699	71,060	343,262	225.824
Lincoln	6.201	4.971	2,322	15,856	9,156
Mercury	23,234	23,639	16,883	85,998	55,017
Total Ford Group	125,754	120,309	90,265	445,116	289,997
Buick	51,188	45.955	32,175	175,235	109,111
Cadillac	11.021	11.062	9.002	41.333	29.380
Chevrolet	139.576	134,636	88,263	490,124	298,463
Oldamobile	35.467	32.228	22.771	122,020	77.030
Pontiac	42,539	38,237	27,238	142,822	91,935
Total-G. M. Group	207,791	262,118	179,449	971,534	605,919
Kaiser-Frazer Group	3.558	4,652	5,675	15,306	20,494
Hudson	11:540	10.243	6,984	36,595	29,545
Nash	21.258	19.050	15.493	75.239	33.841
Packard	10,105	9.937	6,290	40,979	21,734
Studebaker	24,465	19.633	14,688	80,458	62,230
Willys	6.313	5,708	4,541	22,372	18.011
Total All Makes	619,185	568.997	414.242	2,121,253	1.402.048

Men in the News

Current Personnel Appointments and Changes at Plants of Automotive Manufacturers and Their Suppliers



Eaton Mfg. Co. -W. A. Mattie was appointed general man-ager of the Heater the Heater Div. following the death of C. C. Bradford. He is succeeded as superintendent by R. F. Gamundi.



Twin Coach Co. — Walter C. Smart, general sales manager of the motor vehicle division, has been elected vice-president.





Gabriel Co. - Dr. John Ruze has been appointed director of the firm's laboratories in Needham Heights. Mass.

Tinnerman Products, Inc.—Robert C. Overstreet was elected executive vice - president and reelected secre-

Borg-Warner Corp.-C. S. Davis, Jr., president and general manager of the Norge Heat Div., was elected a board member last month.

Ford Div.-Charles J. Seyffer has been assigned manager of sales administration.

Vellumoid Co.-Richard D. Seamans advanced to board chairman recently. Lewis Wald succeeds Seamans as president, and Thomas G. O'Neil becomes vice-president.

Greer Hydraulics-William B. Killough has joined the firm as director of personnel.

Detrex Corp. - Appointment of George W. Walter as director of technical publications has been announced.

P. R. Mallory & Co.-Phil Watson now is manager of the welding division, while the former manager, Bill Fetter, is manager of the switch di-

Federal Fawick Corp. - Theodore E. Metz has been named advertising manager.

Ainsworth Mfg. Corp.-Edward O. Hascall was appointed director of purchasing, succeeding retiring C. L. Miller.

Chrysler Corp.-Raymond E. Hewlett has been advanced to general manager of the Michoud Ordnance Plant.

Dearborn Motors Corp. - David Meeker was named assistant general sales manager in charge of staff operations recently.

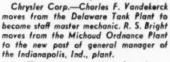
Kaiser-Frazer Sales Corp.-E. W. Berger was raised to vice-president and manager of dealer franchising.

Willys-Overland Export Corp .-Frederick Fleischmen, formerly with Ford International, has been appointed manager of advertising and sales promotion.

Aluminum Co. of America-M. M. Schratz, controller, was elected to a newly-created vice-presidency.

Elastic Stop Nut Corp.-Samuel B. Casey has been elected to the board to replace his brother, John F. Casey, who died recently.

Electric Auto-Lite Co .- New directors elected last month are J. P. Falvey, T. W. Flood and L. H. Middleton, all vice-presidents. New vicepresidents elected are F. J. Kennedy, secretary; George A. Kessel, assistant comptroller, and Donald B. Seem, director of advertising.



(Turn to page 228, please)

Necrology

William C. Royal, 48, Cleveland representative of the Selas Corp., died on Apr. 9.

Howard A. Phelps, 47, master mechanic of Pontiac Motor Div., died at his home on Apr.

Frank Purnell, 66, chairman of Youngstown Sheet and Tube Co., died Apr. 19 at Youngstown, O.

Stephen W. Jessup, chief estimator and designing engineer for the Jervis B. Webb Co., died Apr. 21 at Birmingham, Mich.

Arthur G. Hopcraft, 67, head of purchasing for Cleveland Worm & Gear Co., died Apr. 22 in Cleveland, O.

David J. Bonawit, 60, chief engineer for Marshall-Eclipse Div. of Bendix Aviation Corp., died at his home in Albany, N. Y., on Apr. 22.

James R. Thompson, retired manager of the metallurgical department, American Steel & Wire Div., U. S. Steel Corp., died in Cleveland, O., on Apr.

John Good, 68, retired consultant to General Motors Corp., died at Garden City, L. I., on Apr. 28.



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The test equipment shown above is the key to saving you time in getting the most efficient friction material for your particular wet clutch.

Normally, finding the right material means installing experimental facings in test clutches until one is found that meets performance specifications.

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Relative torque and engagement characteristics for Armstrong's many cork compounds have been established under the standard, controlled conditions provided by this equipment. Points of difference created by formulation changes are easily detected and cataloged. This means that you have better assurance of selecting the most suitable facing material.

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1200° F. HIGH-TEMP. NUT





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Rollpins are slotted, tubular steel, pressed-fit pins with chamfered ends, They drive easily into holes drilled to normal tolerances, compressing as driven. Extra assembly steps like hole reaming or peening are eliminated. Rollpins lock in place, yet are readily removed with a punch and may be reused.

Cut assembly costs by using Rollpins as set screws, positioning dowels, clevis or hinge pins. Specify them in place of straight, serrated, tapered or cotter type pins.



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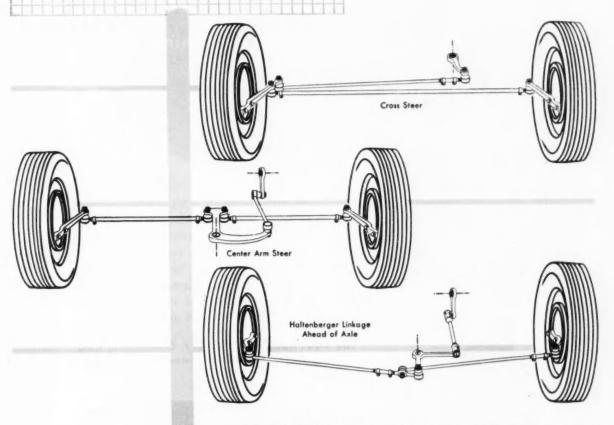
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28

DIVISIONS OF ASSOCIATED SPRING CORPORATION

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STEERING LINKAGE must be developed to meet the requirements of many different car designers. Thompson's "Steering Engineers" have worked closely with car builders for over 35 years to improve steering—to make it safer, easier and more economical.

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Improvements on modern automobiles—reduction of space due to front wheel brakes—re-distribution of car weight by relocation of engines—increased movement of front wheels due to more efficient suspension and precise location of linkage parts with relation to high point on the gear—necessitated better and far more complicated steering units.

Illustrated are 3 of the types of steering linkage found on current-model automobiles. The Detroit Division of Thompson Products has many other variations of steering units designed for passenger cars as well as for trucks and tractors. We welcome the opportunity of submitting them for your examination. Please contact us.

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Specifications	Classifications	EQUIVALENT
	Classifications	of each item
	Class 1 — Natural and/or Synthetic Rubber and	
	Asbestos (Compressed) Group 2 — Oil Resistant	
G-1121	Item I - Med. Temp & Many	
G-1122	Fuel Resistance (CA)	Victopac #1
G-1123	Item 2 - Max. Teme & Good Ol & Aronatic	
G-1123	Item 3 - Max. Temp & Fair Oil &	Victopac #50-V
		Victopac #60-V
	Class 4 — Natural and/or Synthetic Rubber and	
	Group 2 Oil Resistant	1
G-1422-1 G-1422-2	llen 2 — Max. Temp. & Good Oil & Aromatic Fuel Resistance (Sa)	
G-1423-2	Fuel Resistance (SB)	Asbestopac #221
G-1423-3	I lem 3 — Max. Temp. & Fair Oil & Aromatic Fuel Resistance (SC)	Asbestoprene #222 Asbestopac #232
1	100)	Aspestoprene #233
N	Class 5 — Natural and/or Synthetic Rubber and Miscellaneous Fillers	1
G-1523-3	Group 2 - Oil Resistant	
	em 3 — Max. Temp. & Fair Oil & Aromatic Fuel	
	1	Victoriene S
2211	Class 2 Treated Paper	())
-3211	Gloup 1 Gelatin and/or Synthetic Resin Item 1 Max. Oil, Water and Gasoline	
-3212		Vistorite B
-3213	Ilem 2 — Good Oil, Water and Gasoline	Victorite B
	Item 3 - Fair Oil, Water and Gareline	
	Group 2 Contribution Sussiline	Victorite G
	Gelptin and/or Synthetic Resin Im-	
3222	Lauthan Tourney Wood, Cork,	
	Item 2 — Oead Off, Water and Gasoline	Victorite R
0		- would K
	pregnated Company Rubber Im-	100
2212	pregnated Compositions (Wood, Cork,	

On non-metallic gasket materials for general automotive and aeronautical purposes, Victor now gives design engineers a valuable service not available heretofore. Above is a partial list of such packings in the new Victor Gasket Catalog. Note how each material is clearly classified by grade equivalence to standard SAE-ASTM specifications. And besides, Victor gives you

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Largest Materials

HEN the Fifth National Materials Handling Exposition opens May 18 in Philadelphia's Convention Hall, there is every indication that it will be the largest ever held. Approximately 300 companies will exhibit many new developments with their regular lines of products, including a huge variety of machines valued at more than \$10,000,000.

This great industry, which is making tremendous contributions to higher production and lower costs in the automotive and aviation fields, will assemble over 3000 experts at the show to discuss every phase of mechanical handling with visitors. Attendance is expected to go over the 25,000 mark with 40 countries represented. Some companies are said to be planning to send "teams" of as many as 20 representatives to cover the show during the five days.

Improved conveyor systems, newly-designed industrial trucks, some equipped with torque converters and one with a gas-electric drive, will be on display together with numerous other types of equipment. Many of the new machines are described and illustrated in this special issue of

By

James R. Custer

Industrial Truck Data

The most complete and up-to-date tabulation of its kind, a special booklet of 1953 industrial truck specifications has been prepared by AUTOMOTIVE INDUSTRIES and will be distributed at the Materials Handling Exposition (Booths 239-241) in Philadelphia. In it are reprinted the industrial truck specifications of 29 manufacturers published in the Annual Statistical Issue (March 15, 1953) of AUTOMOTIVE INDUSTRIES and in addition it contains the specifications of two companies' industrial trucks that were not available in time for the Statistical Issue. This booklet is listed in Free Literature on page 73 of this issue and can be obtained without charge by circling the assigned code number on the business reply card attached to that page. Other timely materials handling literature also is listed under Free Literature.

AUTOMOTIVE INDUSTRIES, beginning on page 60. To simulate radio operations at a factory having a low power industrial license, one electrical manufacturing company will operate a radio system with two-way equipment installed on materials handling vehicles in the booths of eight manufacturers. Another demonstration staged by two companies will show fork-lift trucks being operated under direc-

Handling Show

tions sent to their operators by radio from another booth where the machines will be witnessed in action on television and through monitoring screens.

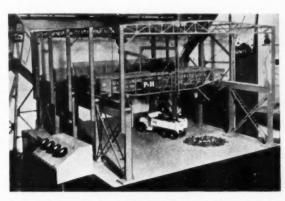
Beginning May 19 a materials handling conference will be conducted concurrently with the exposition. The conference, sponsored by the American Materials Handling Society, will consist of a series of workshop seminars to be held during the mornings of three days so that there will be no conflict with show attendance.

A group of 42 experts from outstanding industries will head the seminars, which will be devoted to the following topics on each of the three days—Handling in Process, Warehousing and Shipping, Packaging for Improved Handling, Bulk Handling, and Requirements for Organization-Study-Analysis. This arrangement was made so that an engineer can spend nine hours in a workshop discussion of a single aspect of his work, or devote three hours on each of three subjects.

The history of materials handling in thousands of automotive and aviation plants, including parts and supplier factories, goes back many years. From the beginning Automotive Industries has published



Industrial trucks and tractors have varied uses at airfields as well as in aviation plants.



Among the materials handling highlights will be the equipment demonstrations. This photo shows an overhead traveling crane model, complete to minutest detail, which will be operated at the exposition.

hundreds of articles analyzing advancements in mechanical handling. So in this issue AUTOMOTIVE INDUSTRIES adds to this long list more illustrated articles describing some newest installations. It is significant that today another great development is unfolding—the automatic handling of materials and parts in both process and assembly operations.



Below—As the sheet metal parts conveyor nears the loading dock it carries hood and fenders. This view shows the transfer of sheet metal to buggies which facilitate loading into the freight cars.

Above—Section of the 1970-ft sheet metal parts conveyor near the start of the trip to the freight loading dock. Hood halves are inspected on the fixture at the extreme left, loaded onto the conveyor, and are headed for the all spray booth on the way to the dock.

Extensive Conveyor Lines

Facilitate

Powerglide Operations



A corner of the Bullard department where Powerglide converter housings are machined. This view highlights two types of conveyor systems—roller conveyors for feeding work to the machines; and the monorali conveyor for transporting machined housings to succeeding operations.

Monorail Conveyor Systems—Chevrolet-Cleveland Plant

	Length in Feet		Length in Feet
Sheet metal parts delivery from production area to shipping dock	1970	Transmission converter assembly delivery to final assembly line in assembly room	504
Miscellaneous transmission steel parts delivery from production area to subassembly in assembly room	1575	Transmission miscellaneous subassemblies delivery to final assembly line in assembly room	525
Transmission case and housing from production area to head of final assy. line in assembly room		Transmission planet carrier parts delivery from production to machining assembly	190
Miscellaneous transmission cast iron parts deliv- ery from production area to subassembly in as-		Transmission short pinion delivery from hones, through hobs, to chamfering machines	165
sembly room	947	Transmission low and reverse sun gear delivery from bores, through hobs, to chamfering machines	
Transmission case and housing delivery to line bores	530	Transmission long pinion delivery from hones, through hobs to chamfering machines	264
Transmission converter parts delivery from production to converter assembly floor conveyor	535	Transmission overrun cam delivery from lathe,	
Transmission converter housing and pump assembly delivery from broach through grinders to lathes)	through broach, to mills	
Transmission final assembly delivery from test stands, through button-up and painter, to unload- ing area at shipping dock		Outer ends for 6 x 6 truck axle housing from Bullard, through lathes to grinders	
Truck propeller shaft ends delivery from center ing machine, through lathes and hobs to hardening furnace		6 x 6 truck axle universal joint inner and outer ends delivery from inspection through mills, to heat treat	
Truck propeller shaft ends and yokes deliver from production to final inspection		6 x 6 truck axle housing and housing outer ends delivery from production to inspection	
Truck parking brake parts delivery from production to final inspection		6 x 6 truck axle final assembly delivery from assembly line, through painter, to unloading area	
Transmission converter housing delivery from Bullards, to bores and to drills	n . 198	at dock Transmission converter stator delivery from	n
Green transmission case and housing deliver through normalizing furnace to first machinin operation	ģ	broach to lathes Transmission output shaft delivery from shavers through grinders to bore	
Transmission final assembly delivery from assembly lines to test stands		Transmission oil pump drive gears delivery from broach, to bores, to hobs, to shavers	
Transmission converter assembly delivery from		Transmission oil pump driven gears delivery from bores, through broaches, to lappers	

By Joseph Geschelin

WITH the increasing demand for Powerglide transmissions the Chevrolet-Cleveland plant has completed mechanization and conveyorization to the point where the plant currently boasts almost four miles of monorail and gravity reller conveyor systems. Of this total there are 15,725 ft of monorail conveyors.

To visualize the extent of conveyorization, tabular data listing the function and length of the principal monorail conveyors are reproduced here. Since this is a multiple-purpose plant, producing parts and assemblies for military contracts as well as sheet metal and parts for other civilian operations of the company, the tabulation covers all conveyor systems. The company

plans additional conveyors in the near future in keeping with 1953 production goals.

It may be of interest that the 1970-ft sheet metal parts delivery conveyor is one of the fastest moving lines to be found in current practice. Due to the volume of sheet metal required by Chevrolet assembly plants, the conveyor is geared to run at a speed of around 110 fpm. It makes a large elevated loop at one point to go through a high-mounted booth in which the moving sheet metal is thoroughly coated with an oil mist to prevent corrosion in transit and in storage.

The illustrations presented here represent a sampling of some of the interesting monorail and gravity roller conveyor installations. In many instances such as in the Powerglide assembly department, for example, there is a veritable maze of conveyor systems moving in many directions at the same time.

Final Powerglide assembly conveyors are of par-



Within the air-conditioned Powerglide assembly department is an elaborate complex of monorail conveyors serving the many subassembly stations. Delivery conveyors dip down to table height to facilitate removal of parts, while return conveyors move along at the upper level.



Glimpse of the enormous Bullard department which handles preliminary operations of Powerglide transmission cases. Here may be seen one of the mazes of gravity roller conveyor sections transporting cases to the machines, then out of the Bullards on other sections in background.



View of a portion of the final assembly line, showing the heavy duty monorall conveyor in the background delivering parts and sub-assemblies to this line. In the foreground may be seen the array of valve bodies removed from the conveyor and fitted with gaskets ready for installation on the line.

Among the numerous applications of gravity roller conveyors is this one for delivery of castings to the sait bath normalizing furnace. Castings are loaded in special heatresistant trays for this purpose.



ticular interest. As illustrated, these conveyors are of special design, each one running a full 160 ft in length.

Because of size and massiveness of the fixtures, it was not considered practical to employ a continuous conveyor chain carrying fixtures underneath for the return to the starting station. Instead, they have a conveyor slide moving the fixtures step-by-step, one fixture at a time, the fixtures being loaded at one end

by elevating from the low level return conveyor, then unloaded at the last station and lowered onto the low level conveyor.

The elevator at the starting end of the conveyor is the key to its operation. As a fixture is picked up from the floor conveyor and raised to the level of the assembly conveyor line, an air cylinder pushes the fixture forward by one station and at the same time clears the fixture at the unloading end for removal.

The Great Mistake of Karl Marx

By Benjamin F. Fairless

Chairman of the Board, United States Steel Corp.

About a hundred years ago, when our American Enterprise system was just beginning to provide our people with all the luxuries which have now become so commonplace in their daily lives, two very brilliant and highly educated men named Marx and Engels published in Europe a document which has inflamed the minds of greedy men in every corner of the earth. They called this document a "Communist Manifesto," and it has become the Unholy Bible of the Socialist's religion.

Briefly, Marx argued that workers would never be free until they, themselves, owned the facilities of production. He declared that they could only acquire this ownership through revolution; and to foster that revolution, he preached the doctrine of class

hatred. He saw workers and owners as natural and eternal enemies. Thus, more than a century ago, he started the "Hate-Your-Boss" campaign which persists to this day—even in America, unhappily.

But in developing this theory, Marx made one fatal mistake which has spread misery and suffering all over the world: he thought that public ownership and Government ownership were one and the same thing; and of course, they aren't. They are poles apart as millions of wretched people have discovered to their sorrow.

The workers in Russia had their revolution, but they do not own the tools of production. The State owns the tools; the Commissars own the workers; and the workers own nothing at all. Then the workers in England had their revolution, too. It was a quiet little revolution which was fought with ballots instead of bullets, but which placed Labor in absolute control of the government for six years. During this time the government, acting in the name of Labor, took over virtually all of the key industries in Britain; but still the men who worked in the coal mines, in the steel mills, and on the railroads did not own the tools of production.

The government owned them; and while Labor, in turn, owned the government, after a fashion, the mer themselves soon found that they had merely traded one set of bosses for another. Instead of taking orders from the former owners of these en-

(Turn to page 98, please)

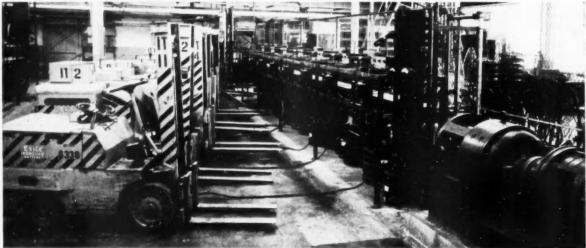
Radio-Controlled Industrial Trucks



Expedite

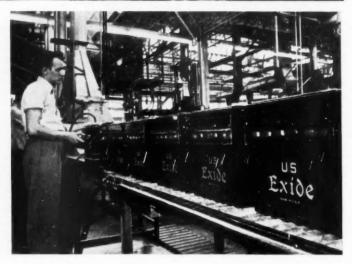
Materials Handling

Left—Radio equipment is utilized to dispatch one-third of the fork lift trucks used in the Exide plant. The materials handling vehicles are controlled from the dispatcher's office. Small magnetic blocks on the plant layout panel depict the trucks. This system has expedited handling and minimized supervision.



Above—All of the battery powered equipment is charged overnight after being in operation during the day. Here are shown a few of the trucks which have just been removed from service after working a full eight hr shift.

Right—Roller type conveyors are used in many places throughout the 19 acre plant. At this point, aircraft batteries for both gas turbine and reciprocating engines are tested and moved along with a minimum of manual effort.



Right — A special attachment was designed by Exide materials handing engineers for transporting lead pigs to consuming departments with out the use of pallets.



By Thomas Mac New

AFTER moving into its new plant in Philadelphia, Pa., the Electric Storage Battery Co., exploited the one story building to get the most out of modern materials handling techniques. One of the most upto-date practices inaugurated was the installation of radio equipment on one-third of the total number of fork lift trucks used in the plant. Altogether, there are 98 electric powered trucks of various makes and types which are employed for the conveying of materials essential to the manufacture of Exide, Exide Ironclad, and Exide Manchex batteries, and for handling the finished product for shipment.

Concerning the radio controlled trucks, these vehicles do not operate on a regular schedule or route. A dispatcher sends a truck to that department which requests special or extra assistance. Complete control is maintained in the dispatcher's office by a panel containing the plant layout and small numbered magnetic blocks which portray the radio-equipped fork lift trucks, as shown in the accompanying illustration. This department utilizes an open telephone so that any personal conversations are kept to a minimum in cases where another department is calling in for materials handling aid.

Sections making requests of the radio-equipped vehicles must state to the dispatcher the type of load, weight, where located, and the destination of the material that is to be transferred. As these requests are made of the dispatcher, they are immediately written into a log book. From the log, the dispatcher is able to schedule pickups and deliveries, select proper type trucks and route his equipment in such a manner

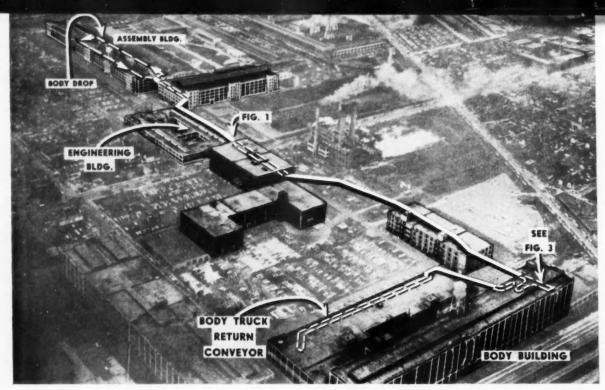
that the truck will carry a load of material in both directions. Truck assignments usually are based upon proximity to the load and availability.

Trucks not equipped with radio are assigned to certain production departments and are on routine work. Many of the trucks throughout the plant are consistently picking up loads that vary between 3000 and 400 lb, so Exide has purchased equipment with capacities ranging between 3000 and 6000 lb. All of the trucks are equipped with solid rubber tires. For the entire materials handling setup, the Electric Storage Battery Co. has spent approximately \$3\%4 million for mobile equipment.

Various types of special truck attachments have been developed for handling materials that are not palletized. In one particular case, Exide ingenuity has eliminated a possible palletized operation. The case in point concerns lead pigs which are stacked longitudinally and transversely in rather high piles. A special attachment was made to readily place on a fork lift truck so that palletizing the pigs was unnecessary; this is shown in one of the accompanying illustrations. Every pig has an integral lip cast at each end of the longitudinal section; therefore, the attachment was designed with an underslung rail for reaching under the pigs and lifting them off of the pile in palletized style.

In addition to the host of battery powered industrial, lift, and hand trucks transporting materials throughout the 19-acre plant, there are numerous conveyors running through the production lines. Most

(Turn to page 104, please)



Aerial view of Studebaker plant showing new body structure extending through and over seven buildings. Note the interior return loop at far end. Dotted lines are used to indicate where conveyor system goes through buildings.

Mile-Long Body Conveyor System

Ald to be one of the longest body conveyors in the industry, a new system recently installed at a cost of \$625,000 is now in full operation at the Studebaker Corp., in South Bend. The problem at Studebaker has been that body finishing and painting operations are completed on the sixth floor of the body plant at the extreme north edge of the manufacturing area whereas the body drop is located on the third floor of the assembly building at the extreme south end of the property, a distance of some 2055 ft.

In the past bodies were transported on truck trailers and this entailed delivery of bodies by elevator to the ground floor, transportation on city streets to the assembly building, then by elevator to the third floor. The new arrangement eliminates the traffic problem by taking the trucks off the street and relieves congestion on the elevators, making them available for must operations.

Figure 1 shows one section of the body conveyor structure, the enclosure being 17 ft wide and 10 ft

New Installation at Studebaker Plant Has Twofold Use

high. Constructed and installed by Anchor Steel and Conveyor Co. of Detroit, the system is carried over or through seven buildings. For example, the illustration shows the enclosure running over the roof of the engineering building at the right. Immediately to the right of the engineering building, out of this view, the body conveyor runs through one corner of another building.

Figure 2, a view taken inside the enclosure, indicates the arrangement for transporting bodies by means of balanced hangers off the conveyor chain. It is of interest that the return line on the left is used to deliver rear fenders, seat cushions, ducts, and other parts to the body plant for installation in bodies be-

Fig 1—Section of the new body conveyor as it crosses a main street in South Bend. On street is shown the former method of transporting the bodies by truck. In the photo the conveyor passes through the storage building at the left, then across the street, and traverses the roof of the engineering building.

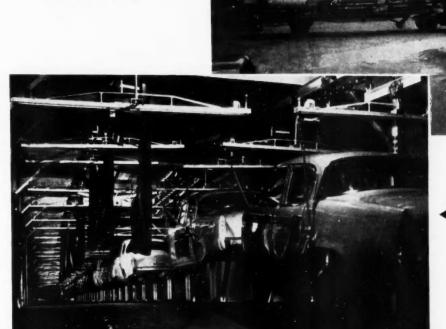


Fig. 2—Interior of the enclosure, showing finished bodies moving to the final assembly line. At left is the return conveyor transporting rear fenders, seat cushions, ducts, and other parts to the body plant for installation in bodies.

Fig. 3 — Finished bodies, on the sixth floor of the body plant, are being attached to the overhead conveyor line ready to enter the enclosure at the extreme right.

fore they are delivered to the assembly line.

Figure 3 shows finished bodies, as they come from the paint shop on dollies. At the point seen here bodies are attached to the balanced hangers on the conveyor ready for movement into the enclosure which starts its trip at the extreme right.

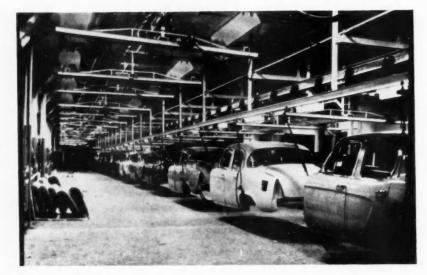
1953 Studebaker bodies are assembled and welded on the first floor of the body building. After welding, the "body-in-white" is placed on a castered body truck. From this point the body is carried through successive metal finishing, painting and trim operations on Anchor single strand drag chain conveyors on the second to sixth floors.

Rear fenders, painted in another building, are carried on the return strand of the body delivery conveyor to be assembled to the body on the third floor of the body building.

At the completion of trim operations on the



Body conveyor passing through the assembly building showing stabilizing rails which steadythe bodies, permitting installation of hardware and other operations. Body assembly operations on overhead conveyors are unique in the automobile industry.



This photo shows spans of conveyor bridge before covering.

sixth floor, the bodies are transferred from the floor truck to specially designed carriers on an overhead trolley conveyor. Floor trucks return to the first floor on an overhead conveyor through a short enclosed bridge.

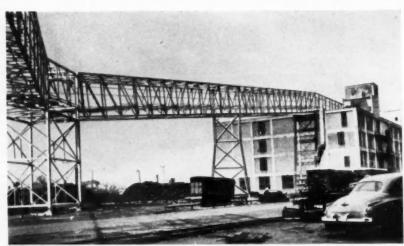
From the body building, the completed bodies travel by overhead conveyor to the final assembly building through an enclosed overhead bridge which spans

parking lots, several buildings and a city street. One span is over 156 ft between supports. This bridge starts at an elevation of 92 ft, dropping to 45 ft in a distance of over one-half mile. In this length there are approximately 175 bodies spaced on 15 ft centers. It takes 3 hrs for a body to complete its "sky ride."

The conveyor itself is over 5500 ft long, the return strand being utilized to carry rear fenders, seat cushions, and other finished parts to the body building.

This conveyor is driven by two 7½ hp caterpillar drives, electrically synchronized, so that the speed of the conveyor can be varied from 3 to 26 fpm by a central rheostat control. Stop-start stations along the line are connected with the central control panel by an inter-communication system for maintenance convenience.

At the end of the bridge the bodies enter the final assembly building, where rollers on the carrier cross arms contact stabilizing rails parallel to the conveyor rail. These stabilizing rails steady the body for miscellaneous hardware and instrument panel operations. Bodies are transferred directly from the conveyor to the body drop for assembly to the chassis.



STUDEBAKER BODY DELIVERY CONVEYOR AND HOUSING

Total Conveyor Length Drive Unit capacity

Total horsepower
Conveyor Speed
Body spacing
Number of bodies on line
Body travel time
Body Travel distance
Housing length
Housing weight
Max. Clear span
Inside dimensions
Max height, ground to top of conveyor rail
Total drop

5500 ft
2 Drives at 6500 lb chain pull each.
15 hp.
Variable 3-26 fpm.
15 ft centers.
Approx. 175
Approx. 3 hours at mean Approx. ½ mile.
1663 ft
390 T Structural Steel.
156 ft
10 ft high x 17 ft wide

92 ft 45 ft

New Turnover Fixture

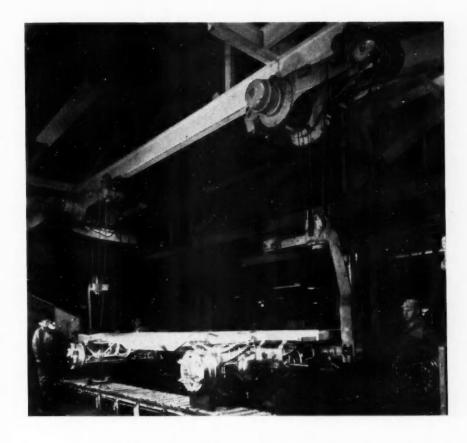
for Large Truck Chassis

its continuing program of modernization of facilities, particularly with respect to materials handling, Reo Motors, Inc., recently installed a new chassis turnover fixture on the assembly line at Lansing. Operated by twosix-ton capacity Yale electric hoists, the mechanism entailed an outlay of \$50,000. It replaced the former timeconsuming hand and power-operated fixture.

As illustrated, this massive turnover fixture is designed to handle the wide variety of chassis types built by Reo. It has huge clamps at both ends for secure attachment to cross members for the flipping operation.

Reo assembles the chassis in conventional fashion, with the frame

upside-down to facilitate installation of springs, axles, etc. The fixture then is used to lift the chassis above the conveyor, flip it over so it is right side up, and



lower it onto the conveyor for final assembly operations. The view seen here shows the last stage of this operation.

Mexico Puts Quotas on Vehicle Output

The Mexican government has ordered a return to the quota system for automobile assembly plants and has imposed a one-third cut in production for this year. Although government officials stated that quotas were imposed to save dollar exchange, it is understood that a principal reason was a request from dealers who complained that they could not sell all cars produced. Under the quota system 30,000 cars and trucks will be

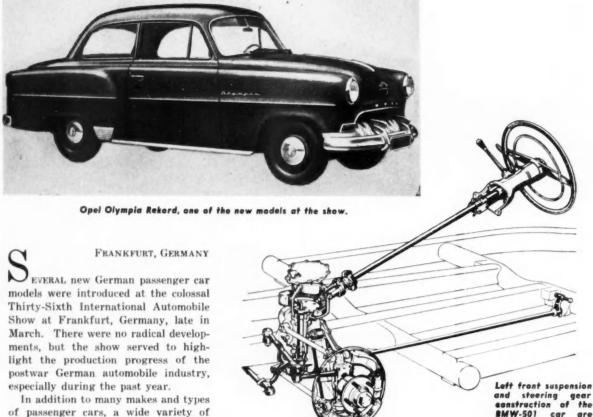
permitted this year compared with 46,800 in 1952. General Motors is protesting its quota of 9000 units compared to Ford's 8500. In the free market existing for the past two years, General Motors sold 40 per cent of the market but under the quota system is held to 30 per cent. Other quotas are: Studebaker and Nash, which are assembled in the same plant, 1200; Packard, British Hillman and Mack truck, all built in the same plant, 700; Willys, 1250; Fiat, 700; Kaiser-Frazer, 275; International trucks, 1500; Federal trucks, 100; and

the figure for miscellaneous is 575.

The erection of a Diesel-Fiat plant is proceeding smoothly, according to a recent report. Production of trucks is scheduled for the middle of 1954.

Construction of the Willys-Overland assembly plant in Mexico will be completed soon. A company spokesman revealed that the various departments require only finishing touches in machinery installations. The Mexican subsidiary will launch a national promotional campaign stressing agricultural and industrial uses of the jeep as well as for off-main highway uses.

New German Cars Displayed at Huge Frankfurt Show



In addition to many makes and types of passenger cars, a wide variety of buses, trailers, light and heavy trucks, motorcycles and scooters, together with accessories of all kinds, were displayed in a score of halls and in open air parks. There were 16 makes of passenger cars

from the United States, 14 from Britain, five from France, two from Italy, and two from Czechoslovakia. Germany had 15 makes of passenger cars at the exhibition. A total of 584 firms participated to make this one of the most important events of its kind to be held in the world.

The news event of the show was the announcement of Volkswagen price reductions, the second this year. Early in January 1953, the price of the standard model was lowered from 4600 to 4400 German marks. On the opening day of the Exhibition, the firm announced a further reduction in the price of the standard model to 4150 German marks.

The power plant of the Volkswagen, located behind the rear axle, has an improved synchromesh transmission which permits silent shifting between fourth, third, and second speeds. This is furnished as standard equipment on all export types.

The Volkswagen factory at Wolfsburg, near Brunswick is producing at the rate of 136,000 cars a year and employs 17,000 workers. In 1952 it exported 46,000 cars and will attempt to sell more cars to the United States, according to a recent announcement by General Manager Dr. Nordhoff.

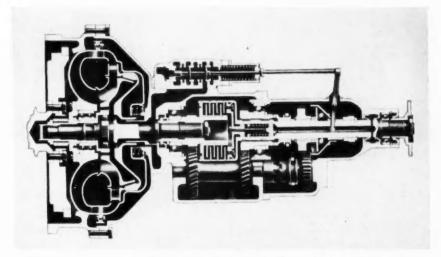
The Opel-Olympia-Rekord was shown to the public for the first time at this exhibition and drew consider-

shown in this part-

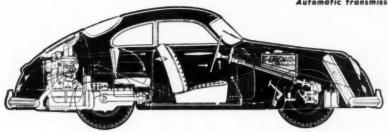
cutaway view.

By O. V. Drtina

Special Dispatch to
AUTOMOTIVE INDUSTRIES



Automatic transmission of the Borgward-Hansa 2400 model.



Longitudinal sectional view of the Porsche car.

able interest. It has a four-cyl, 90 cu in., four-stroke engine which is said to be very economical. The body is roomy, and has a large rear luggage compartment.

Borgward-Hansa exhibited its 2400 model and the recently-announced Diesel powered Model 1800. A feature of the Model 2400 is its fully-automatic transmission.

Bayerische Motoren Werke A. G. in Munchen presented the new BMW-501 car. A chassis also was shown at the exhibition. An interesting feature was the suspension of wheels on four long torsion bars, each of which can be individually adjusted by a set-screw.

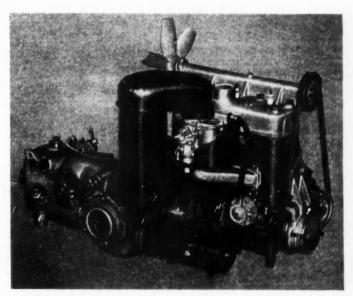
The car is powered by a six-cyl engine of 120 cu in. piston displacement, which develops 65 hp at 4400 rpm. The clutch is hydraulically operated and the transmission has Speer-synchronization. The frame is a combination of welded tubular and box-type steel members, and is said to be very strong and rigid.

A special development of the DKW, shown for the first time, is a new DKW-Sonderklasse car with a three-cyl, two-stroke, water-cooled engine. DKW offers also a line of light trucks up to about ³/₄ tons carrying capacity. They differ from the passenger car only in their stronger frame construction and longer wheel base.

Goliath Werke, Bremen, brought out a new small car, Goliath GP 700, with a twostroke, two-cyl, water-cooled engine of 42 cu in. piston displacement, equipped with a new Bosch

fuel injection pump. With this injection pump, the output is 29 hp. Compresson ratio is 7.7 to 1.

It is claimed that an increase in fuel economy of about 20 per cent is achieved by using the injection pump instead of a carburetor.



Powerplant of the DKW-Sonderklasse car. The three-cyl, two-stroke engine has a piston displacement of 55 cu in.

Automation Problems Analyzed at Machine Tool Forum

Among the outstanding papers presented last month at the Westinghouse Machine Tool Electrification Forum, which was reviewed in the May 1 issue of Automotive Industries, page 130, several dealt with automation problems, a subject of extensive interest among mass production engineers. Extracts from them are presented herewith.

Automation—and the Transfer Type of Machine Tool

By Stanley I. Rice
The Heald Machine Co.

RANSFER type machine tools are used where high production is required and where many drilling, boring, reaming, and similar operations are involved. A typical workpiece would be an engine block.

Such a machine is generally set up with a loading station, several work stations and intermediate stations, and an unloading station. A rough part begins at the loading station and is transferred down the length of the machine, stopping at every station where machining operations are performed. Sometimes the part remains idle in intermediate stations.

This type of machine generally consists of a series of separate machines tied together by one long transfer bar which is operated by one or several hydraulic cylinders or equivalent mechanical means. The machine can be divided into sections or units to enable continued production in case of partial machine shut down. This is accomplished by providing a removable link in the transfer bar and by using suitable selector switches to cut out the part of the machine that is down. However, this introduces switching problems and necessitates a duplication of control and safety inter-

The hydraulic operation may be initiated from one central hydraulic pump but is generally operated in two or three sections, each with its own

hydraulic pump and tank. The hydraulic system will then tie in electrically with the draw bar linkage.

Electrically, each individual section should be a complete machine in itself so that it can be started, operated, and stopped without power to the other sections. Thus the tools at one section may be serviced or changed without operating the other sections of the machine. Selector switches must be arranged so that the operator can change from one section operation to other combinations with a minimum of down time.

On many sections it becomes necessary to use depth-of-cut circuits as, for instance, on a drilling operation that is followed by a boring operation. If the drill does not complete its operation, a broken boring bar is assured in the next station. This is accomplished with a limit switch that operates at the end of the drilling stroke to close a mechanical latching type relay, and with a limit switch that closes with the table in the retracted position. Only when the full depth of cut closes the latching relay can a circuit be completed through the table-out limit switch to allow the transfer of parts. A latching type relay is necessary, because it will not fall out to cause an improper indication should the operator stop the machine or should a circuit breaker open.

It is generally mandatory to use a circuit that requires the transfer bar to return completely before it makes the forward stroke, and to complete the forward stroke before retracting, even on hand cycle. If allowed to return part way and reverse, it may pick up a part - perhaps because a pawl catches in a hole or because of casting unevenness - and partially transfer it with the inevitable improper positioning or misclamping. To make sure the parts will be clamped before a machining operation takes place we use a limit switch that will close only when the part is exactly in place, and a pressure switch which makes sure of the clamping pressure on the part before a table is allowed to advance. The two switches are wired in series. The pressure switch should be added because a part may be in place but not clamped with sufficient pressure, or may be clamped in a cocked position, either of which may be disastrous.

When the operator at the loading station loads a part properly, a limit switch is closed. This switch is connected in series with the cycle start button circuit, so operation of transfer cannot start unless the switch is closed.

When the machine is to be operated as a divided machine, suitable selector switches must be provided so that a limit switch having a similar function to the loading limit switch, but located at the intermediate loading station, can interlock the transfer system in a like manner.

Originally the electrical conduit connecting the individual legs or work stations was below the fixture and had terminal boxes between each work station. This made it possible to remove any section of the machine, but proved unsatisfactory because all "through" wires had to be disconnected for shipment, and, in spite of proper gaskets and covers, iron dust penetrated the terminal boxes to cause short circuits. These limitations led to the change to the overhead ductwork system with a terminal and push-button box at the rear of each leg. Wires from the individual limit switches, push buttons, and solenoids in each leg are connected back to the terminal blocks. Wires from an individual leg go without a splice or connection from these terminal boxes to the main switch box. This allows for the removal of a leg from either side of a work station without disturbing the wires going to any other leg. It also provides a minimum number of connections, yet with the terminal boxes at each leg, adequate test points are available.

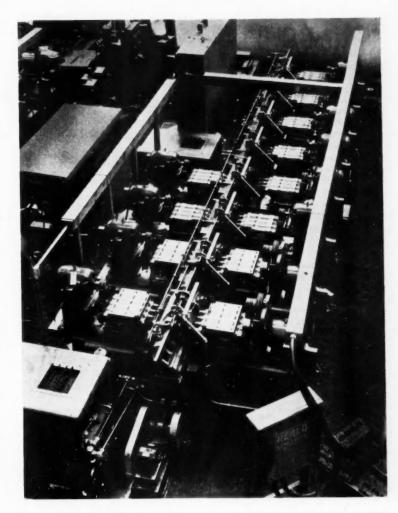
All work stations, insofar as possible, should be interchangeable so that in the event of development of serious trouble in a leg, or of a change in machining sequence, a new station can be inserted or the existing stations interchanged without impossible complications. This allows removal of a work station and replacement of another with a minimum shut down time of the entire machine.

The wires from both sides of every limit switch are brought back to the main switch box so that continuity tests of each switch circuit can be made at the main switch box. It is considered good practice by some engineers to provide indicating lamps so that the operator may check visually whether any limit switch is open or closed.

Although an increased amount of wire is added to the machine, it facilitates service to an extent that justifies the added cost. Each individual limit switch is installed with flexible conduit to allow its physical removal from the machine without disconnecting the wiring. This allows manual operation of the limit switch circuit and makes for ease in replacing faulty switches.

An operator's control, provided adjacent to the operator's station, contains the cycle start button, safety stop button, and buttons to control the main functions of the machine, as well as indicating lights.

In addition, cycle off-on selector switches are provided at each leg so that the service man can kill the automatic cycle, while working on a machine leg, to eliminate the possibility of an accidental starting of the machine by the operator. A steel cable running the entire length of the machine is connected to a limit switch



General view of Heald transfer machine for cylinder heads of new overhead valve engine. Note overhead duct-work system.

which will shut down the entire machine in case of emergency.

Any push buttons used for operations not normal to the machine are provided with lock and key. These push buttons, for instance, may allow an authorized person, during set-up purposes, to move a part down the length of the machine without normal interlocks.

Coordination of Electrical, Hydraulic and Mechanical Elements in Machine Tool Design

By Kurt O. Tech, Chief Engineer

Since World War II, tremendous advances have been made in the machine tool industry, with many of them in the field of special production machine tools. To a great extenthese advances consisted of gradually combining more and more machining

operations into a single machine. This in turn made necessary machines with provisions for automatic locating, automatic clamping, automatic cutting cycles, automatic material handling.

So successful have we been in these developments that today we are reach-

ing out for the automatic factory. Machines such as the Cross Transfermatic represent our present progress. It performs 170 operations on an automotive cylinder block. Machines combining more than five times as many operations are now on our drawing boards.

The success of our efforts in this direction will depend in a large measure upon our ability to control down time. Automatic factories or automatic production lines, regardless of how beautiful they are on paper, cannot be tolerated unles they can be kept in production.

Technically speaking, there is no limit to the number of operations that can be combined in one machine or process. But, when we consider efficiency, there is a limit. It is in the reducing of down time and in the increasing of efficiency to make possible automatic production lines that the future presents its greatest challenge to the machine tool industry.

There are several important reasons for machine down time, but one of the more important is down time as a result of breakdowns. Down time as a result of breakdowns can be practically eliminated, for, in most cases, it results from poor design. There are ways of detecting poor designs without breaking a machine. One of the ways is by coordinating the design efforts of electrical, mechanical and hydraulic designers.

This is stressed particularly for electrical engineers for as machines become more automatic, they become more dependent upon new electrical developments to perform the functions previously relegated to human beings. Devices such as information storage devices, memory devices, and the so-called automatic brain are being used and will be used to a greater and greater extent in the future. With them the job of the electrical engineers will become more and more important in the design and development of our machine tools.

To make machines function efficiently, the electrical engineer must coordinate his work closely with the mechanical design engineer and the hydraulic engineer. The electrical engineer has an important role in achieving this objective. First, he makes sure that all other designers understand the part to be played by electric controls. Then, before proceeding with the development of the circuit, he reaches an agreement on the basic plans which may affect the work of all three engineers. A choice of either an electric or fluid motor or a limit switch and four-way valve control as opposed to a sequence valve are simple examples of the type of

decisions to be made. Certainly this is the time to discuss and tentatively decide on the location of the various types of controls on and around our machine. Having set his goals in coordination with the other engineers involved on this design project, the electrical engineer can now proceed with the development of his circuit. Two basic principles are to be followed in the development of any electrical circuit:

- Control circuits for machine tools should be kept simple. In most large complex equipment they merely represent a repetition of similar functions.
- The physical layout of the control equipment should parallel
 the simplicity of the circuit.
 The components should be so
 arranged that they can be easily
 identified as to function and
 readily serviced.

Automatic Loaders for LeBlond Crankshaft Lathes

By Nelson D. Cooper
The R. K. LeBland Machine Tool Co.

LEBLOND crankshaft lathes types 1 LB and 2 LB for machining the line bearings, and type 6 AC for machining the pins, or for cheeking and pin turning were first designed with automatic loaders in 1950. The Ford Motor Co. requested this design to reduce operator fatigue to a minimum, so that increased production made possible by the use of

shell-molded crankshafts and tungsten carbide tools could be realized. The first machines with automatic loaders were shipped in 1951 to the Cleveland Engine Plant of the Ford Motor Co. They are now successfully machining shell-molded crankshafts at the rate of 46 to 50 per hour.

Experience now shows that crank-(Turn to page 86, please)

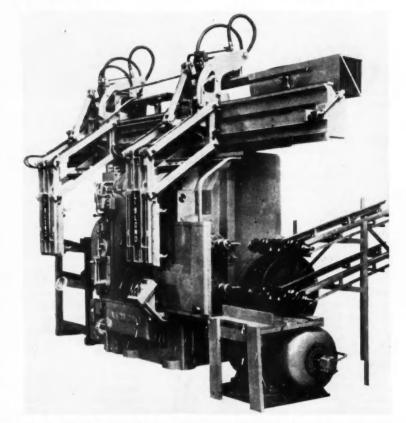


Fig. 1—Type 6AC pin lathe with automatic loader. Side view to disclose two sets of hooks on each arm.

SOVIET AUTOMOBILE INDUSTRY

Expanded and Partially Modernized

By Demitri B. Shimkin

Consulting Editor of AUTOMOTIVE INDUSTRIES on Russian Industrial Affairs; Russian Research Center, Harvard University

In 1952, the Soviet automobile industry comprised eight operating factories and one, at Kutaisi in the Transcaucasus, under construction. This total excludes parts plants. All the Soviet factories were in European Russia, with four—GAZ in Gor'kii, ZIS and MZMA in Moscow, and YaAZ in Yaroslavl—lying within the Central region. The other factories were located in Minsk in Byelorussia (MAZ), Dnepropetrovsk in the Ukraine, Ulyanovsk on the Volga (UAZ), and Miass in the Urals (Ural ZIS). No indication exists that the factory planned in 1946 for Novosibirsk in Western Siberia has been begun.

Generally speaking, the Soviets have substantially completed the investment program contemplated for 1946-50 in the Fourth Five-Year Plan. In addition to building new factories in Minsk and Dnepropetrovsk, they have substantially modernized GAZ, ZIS and YaAZ, primarily through the installation of new conveyer, feed and control systems. Consequently, current productive capacity probably exceeds 600,000 vehicles annually, three times peak prewar output. Actual production in 1950, the latest year for which data are available, approximated 400,000 vehicles, plus another 100,000 in spare parts equivalents. It is estimated that fully 300,000 of these vehicles were trucks, of which 90 pct would come in the 1.5-4.5 m.t. capacity ratings. About two-thirds of all output still derives from GAZ and ZIS.

Current production is not likely to be significantly higher than in 1950 since the target for 1955 calls only for a production increase of 20 pct over 1950. The limiting factors appear to be the availability of fuel for about 2.6 million vehicles (almost triple the prewar numbers), and shortages of metal supply for factories.

At the present time, the Soviets are producing only 21 vehicle models, exclusive of fire engines, fork-lift trucks, amphibians and other special-purpose, limitedvolume designs. Of these, three models are prewar, THIS Article Is a Sequel to "The Automobile Industry That's Behind the Iron Curtain," by Dr. Shimkin Which Appeared in the February 1, February 15, and April 1, 1948, Issues of AUTOMOTIVE INDUSTRIES. The Three-part Series Attracted Widespread Interest at the Time of Its Publication, and Was Publicized by Columbia Broadcasting System, Voice of America, and Many Newspapers.

the GAZ 67B dating to 1943; the GAZ MM, to 1935; and the ZIS 5, to 1933. Ten other models were anticipated in the Fourth Five-Year Plan and went into production between 1945 and 1949. These include the GAZ 51, 63, and M20; ZIS 110, 150, 151, and 154; the Moskvich; and the YaAZ (MAZ) 200 and 205. The ZIS 253, combining the ZIS 150 chassis with a Soviet copy of the GM3-71 Diesel engine, appears never to have gone into series production. Of the most recent models, five are chassis or other adaptations of earlier types: the UralZIS 352 is a modernization of the ZIS 21, the producer-gas version of the ZIS 5; the GAZ 51B is an LP-gas version of the GAZ 51; the GAZ 93 and 651 are, respectively, dump truck and bus bodies on the GAZ 51 chassis; and the ZIS 155 is a bus body on the ZIS 150 chassis. Thus only three vehicles, the ZIM passenger car and the heavy YaAZ (MAZ) 210 and 525 Diesel-powered trucks represent basic innovations since 1950.

It should be noted that several models are manufactured by more than one factory. ZIS 150 and 151 trucks are also made at Dnepropetrovsk, and will be produced in Kutaisi. The Yaroslavl and Minsk factories make identical trucks. Furthermore, the same engine blocks and transmissions are common to numerous models. The GAZ-MM and 67B; the GAZ 51

and 63, and ZIM; the ZIS 5, UralZIS 352, ZIS 150, ZIS 151 and ZIS 155; and the ZIS 154, YaAZ (MAZ) 200 and YaAZ (MAZ) 205 are respectively instances of common engine blocks. The same transmissions are shared by the GAZ 51, 63, MM and 67B; by GAZ M20 and ZIM; by ZIS 150, 151 and 155; and by YaAZ 200 and 205. Thus, widespread interchangeability, with its consequent economies in supply and possible switches of supplier, reducing military vulnerability, is a major Soviet design principle.

The 21 models in production include six general-purpose trucks (two, specially fueled), four dump trucks, three all-wheel drive military vehicles, three buses, and four passenger cars. Although this list excludes a few types manufactured in limited quantities, it is clear that variety of models available to Soviet industry, commerce, and the armed forces is grossly inadequate for the effective and economical performance of many operations. Thus, one of the historical weaknesses of the Soviet automobile industry is still in evidence.

Detailed current specifications are available on 15 models, and are presented in the table. Fragmentary data on two other vehicles are as follows:

 GAZ 651: 19-place bus on GAZ-51 chassis. Empty vehicle weight 8250 lb. Maximum speed, 44 mph; gasoline consumption, 10 mpg.

- (2) YaAZ (MAZ) 210: a 6 x 4 dump truck rated at 13 tons capacity; empty vehicle weight, 24,-250 lb. The six-cylinder Diesel engine, which develops 165 hp at 2000 rpm. It may be a copy of the GM6-71 since a copy of the GM4-71 (Soviet YaAZ 204) has been in production since 1948. The drive to the two rear axles is via individual shafts from the transmission to the respective differentials. The advantages claimed for this are increased articulation of the rear bogy and reduced torque, permitting drive shafts of reasonable diameter. Brakes are pneumatic. Top speed loaded is 35 mph.
- (3) MAZ (YaAZ) 525; a 4 x 2 dump truck rated at 27 tons. The power unit is said to be a 2362 cu in., four-stroke, 12-cylinder Diesel engine developing 300 hp at 1700 rpm. Clutch and steering are believed to be hydraulic. The drive, through a four-speed transmission and differential and planetary reduction gears, is to the rear wheels only.

From the specifications tabulated it is clear that Soviet automotive designs correspond at best to late prewar standards in the United States. For the four passenger-car engines, the average hp per cu in. of displacement (0.392), compression ratio (6.33), and rpm at maximum hp (3600) correspond to the American figures for 1935, 1938, and 1941, respectively. Hypoid gear final drives are found in only two vehicles (ZIS 110 and ZIM); overdrives and automatic transmissions are completely absent. In addition, the continued production of very old models such as the ZIS5 and the GAZ-MM should be noted. Furthermore,

(Turn to page 113, please)

Factory (Make)	GAZ GP truck GAZ 51 ¹ 2.0-2.5	GAZ 4x4 GAZ 63 2.0	GAZ Pass. Car M20"Pobeda" 5
Date, first production	1948 GAZ M51 8 82.0	1947 GAZ M51 6 82.0	1947 GAZ M20 4 82.0
Piston stroke (mm) Displacement (liters) Composition of head Composition of pistons	110.0 3.48 AI AI	110.0 3.48	110.0 2.12 A1 A1
Compression ratio Valve arrangement Max. bhp Rpm at max bhp	6.2 L 70 2800	6.2 70 2800	6.2 L 50 3800
Max. torque (kgm) Rpm at max torque Battery amp hr Battery voltage	20.5 1600 70 6	20.5 1600	12.5 2000 54 12
Magneto Starter hp Starter voltage Fuel system	No 1.8 12 MP	No MP	No 1.6 12 MP
Tank capacity (liters) Carbureter: Make Type Oil filter Lubricating system	105 K49A DS Yes	220 K49A DS Yes FS	55 K22A DS Yes FS
Transmission	M	M	M, 2 & 3
Clutch Gear ratios: First Second Third Fourth	SP, ½C 6.40 3.09 1.69 1.00	SP, ½C 6.40 3.09 1.69 1.00	SP, ½C 3.115 1.772 1.00
Fifth	7.82	7.82	4.00
Auxiliary transmission Auxiliary transmission ratio No, of driving axles. Type of rear axle	No 1 FF	Yes 1.96 2 FF	No 1 3/4F
Type of final drive. Final drive ratio. Steering gear. Steering ratio.	\$B 6.67 WR 20.5	SB 7.60 WR	\$8 5.125 WR 16.6
Service brakes: Type	H 4W 3.0/3.5 750/20	H 4W	H 4W 2.0 600/16
Total wt, empty vehicle (kg)	2710 1300 1410 3300	3280 1650 1630 3300	1480 2700
Overall: length x width x ht (mm). Tread width: front, rear (mm) Clearance (mm) Turning radius (m)	5335x2040x 1970 1405/1600 200 7.60	5525x2200x 2185 1600 275	4665x1695x 1640 1360 200 6.00
Cargo space: length x width x ht (mm)	2450x1870x 500	2940x1990x 890 65	105
Max speed (km/h)	70 Yes 26.5	Yes	No 13.5

ABBREVIATIONS

ıminum	
1	
st Iron	
m and lev	e
al down-	
igle down-	
ssure (lubr	i-
I floating	
iting (rear	
	st Iron im and lev al down- igle down- issure (lubr n) I floating

Hyp—Hypoid
H—Hydraulic
MP—Mechanical
pump
M—Mechanical
2R—Dual ratio
S—Splash
SB—Spiral bevel
SP—Single plate
US—Single updraft
WR—Worm and
roller
WS—Worm and
segment

AND SPECIFICATIONS OF SOVIET MOTOR VEHICLES-

GAZ Pass. Car ZIM 6	GP truck GAZ MM 1.5	UAZ 4x4 GAZ 67B	ZIS ² GP truck ZIS 150 4	ZIS ² 6x6 ZIS 151 4.5	ZIS Bus ZIS 154 37	ZIS Bus ZIS 155 29	ZIS Pass. Car ZIS 110 7	Ural ZIS3 GP truck ZIS 5	MZMA Pass. Car Moskvich 4	YaAZ ⁴ GP truck YaAZ 200 7	YaAZ4 Dump truck YaAZ 205 5
1950 GAZ M51	1935 GAZ M1	1943 GAZ M1	1948 ZIS 120	(1949) ZIS 120 6	1948 YnAZ 204	1951 ZIS 120	1945 ZIS 110	1933 ZIS 5	1947 Moskvich	1948 YaAZ 204	1948 YaAZ 204
82.0	98.43	98.43	101.6	101.6	107.95	101.6	90.0	101.6	67.5	107.95	107.95
110.0 3.48	107.95 3.28	107.95 3.28	114.3 5.55 Ci	114.3 5.55 (CI)	127.0 4.65 CI	127.0 5.55 (C1)	118.0	114 3 5.55 CI	75.0 1.07	127.0 4.65 C1	127.0 4.65 CI
Al			Al	Al	Special CI	Al	AI	CI	Al	Special CI	Special CI
6.7 L 90	4.8 L 50	4.6 L 50	6.0 L 90	6.0 L 92	16.0	6.0 L 95	6.85 L 140	5.3 L 76	6.0 (L) 23	16.0	110
3600	2800 17.0	2800 17.0	2700 31.0	2600 31.0	2000	2800	3600 40.0	2400	3600	2000	2000
1900	1450	1450	1100-1200 70	1100-1200	1000-1200	1100-1200	2000 135 6	800-1100 112 6	2000 60 6	1000 1300	1000 1300
***	86-	*************		No	No		No			Was	Was
MP	No MP	No MP	1.8 12 MP	(MP)	(MP)	MP	1.2 6 MP	1.1 6 MP	0.6 6 MP	Yes 8 24 MP	Ves 8 24 MP
MP	40	70	150	(MP)	270	150	80	60	32	150	150
DD	K14 US	K23 DS	MKZ14, K80 DS	MKZ 15 DS		K81 DS	MKZ-L-3	MKZ-6	K24 DS	100	100
Yes	(No) FS	(No) FS	Yes	(Yes)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
M, 2 & 3 pears synchro	M	М	in 3,4,5 speeds	M, spur gears in 3,4,5 speeds	Electrical	in 3,4,5 speeds	M, 2 & 3 gears synchro	M	M	M, 2-5 gears synchre	М
SP 3.115	SP 6.40	SP 6.40	2D 6.24	2D 6.24	None	2D 6.24	SP, 1/2C 2.43	2D 6.60	SP 3.55	SP 6.171	SP 6.171
1.772	3.09 1.69	3.09 1.69	3.32 1.90	3.32 1.90		3.32 1.90	1.53	3.74 1.84	1.73	3.402 1.786	3.402 1.786
**********	1.00	1.00	1.00 0.81	1.00 0.81		1.00 0.81	12. 10. 10.	1.00		1.00 0.778	1.00 0.778
4.00	7.82	7.82	6.70	6.70		6.70	3.16	7.63	4.44	6.686	6.688
No	No	No	No	1.15, 2.44		No	No	No	No	No	No
1	1	2	FF	3	FF	1 FF	1/2F	FF F	1	FF F	EF
Нур	SB 6.60	SB 4.44	2R 7.63	SB	2R 8.39	2R 9.21	Hyp 4.36	2R 6.28	SB 5.14	28	2R 9.00
4.55	WR 16.6	WR	WR 23.5	6.67	WR 23.5	WR	WR 20.5	CL 15.9	WS 15.0	8.21 WS	WS
H	M	16.6 M			M	A	Н	M	H	21.2 A	21.2
4W 2.5 700/15	4W 2.5/3.25 650/20	4W 1.5/2.0 650/16	4W 3.5/4.25 900/20	4W	Transmission 5.50 1050/20	4W	4W 2.25/2.50 750/16	4W 5.0/5.75 34x7	4W 2.00/2.30 450/16	6W 4.25/5.50 1200/20	4.25/5.50 1200/20
1930	1810	1320	3900	5935	8100	6290	2425	3100	845	6500	
	730 1080	690 630	1800 2100	14-2004-07	2940 5160	2880 3410	1165 1260	1260 1840	425 420	Linesternel	
	3340	2100	4000		5450	4090	3760	3810	2340	4520	3860
	5335x2040x 1970	3350x1685x 1700	6720x2385x 2175		9515x2500x 2940	8260x2500x 2940	6000x1960x 1730	6060x2235x 2160	3855x1375x 1545	7820x2850x 2430	6065x2815 2430
	1405/1600 200	1445 210	1700/1740 290		2700/1810 290	2076/1740 270	1505/1600 210	1545/1675 250	1105/1170 195	1950/1920 290	1950/192 290
6.85	7.50	5.80	8.00		11.3	8.00	7.50	8.60	5.62	9.20	8.5
	2450x1870x 500		3540×2250× 600					3085×2085× 590		4500x2480x 600	3000x2000 785
120 No	70 No	90 No	65 Yes	65 No	65 Yes	65	140 No	60 No	90 No	60 Yes	55 Yea
140	20.5	15.0	38	42	.00	71 E 171 F 1	27.0	29.0	9.0	35	35

FACTORY NAMES

- GAZ Gor'kovskii Avtomobil'nyi Zavod imena Molotova (Gor'kii Auto Plant named after Molotov)
- UAZ Ulyanovskii Avtomobil'nyi Zavod (Ulyanov Auto Plant) ZIS Zavod imena Stalina (Stalin Plant, in Moscow) Ural ZIS Ural'skii Zavod imena Stalina (Urals Stalin Plant,
- in Miass)
- MZMA Moskovskii Zavod Malolitrazhnykh Avtomobilei (Moscow Plant for Automobiles of Small Displacement)

Major sources on Soviet automotive technology are the official journals Avtomobil'naya i Traktornaya Promyshlennost' (The Automobile and Tractor Industry) and Artomobil (Automobile), and the following manuals: A. D. Abramovich et al: "Automobiles"

- YaAZ Yaroslavskii Automobil'nyl Zavod (Yaroslavl Auto Plant) MAZ Minskii Avtomobil'nyl Zavod (Minsk Auto Plant) 1. On same chassis, GAZ 51B (LP fueled), 93 (dump truck)
- and 651 (bus)
- 2. Also manufactured at Dnepropetrovsk.
- On same chassis, Ural ZIS 352 gas producer, burning lignite, wood or peat in different modifications).
 Identical vehicles are also termed MAZ.

(Mashinostroyeniye-Entsiklopedicheskii Spravochnik 11:1-273, Gos. Nauchno-Tekh. Izd. Mash. Lit, Moscow, 1948; and G. V. Zimelev (ed): Avtomobil', Opisatel'nyi Kurs (Automobiles, A Descriptive Course). Gos. Nauchno-Tekh. Izd. Mash. Lit., Moscow, 1952).



Below — A CF-100 Canuck jet fighter being prepared for a test flight.

Above—Airview of the A. V. Roe Canada, Ltd., plants near Toronto. The new engine factory is in the foreground and the aircraft plant is in the background.



A Survey of Canada's Aviation History

By James Montagnes

TORONTO, CANADA

ANADIAN and American-designed military aircraft are now in production at four major Canadian factories, with a large number of subcontractors making components for aircraft and engines. Canada is equipping its fighting squadrons with all Canadian-made jet fighters, and eventually will power these aircraft with Canadian-made engines.

Canadian-designed aircraft and engines are being built at Toronto, while American-designed aircraft and British and American engines are being built at Montreal and Fort William. New plants for engines, and expansion of plants built during World War II, are now practically complete, and production has started on aircraft and engines.

At Toronto a Canadian-designed jet fighter and jet

engine are now in production at A. V. Roe Canada, Ltd., a branch of the big British Hawker-Siddely group of aviation companies. The twin-jet all-weather fighter began on the drawing boards shortly after the end of World War II when A. V. Roe Canada, Ltd., was formed to take over the Canadian government's Victory Aircraft, Ltd., which had made Avro Lancaster and Lincoln bombers. At the same time the Canadian company continued the design of a jet engine started by the government research organization. Now both aircraft and engine are in production, the aircraft being in its fourth model type.

The aircraft is the CF-100 Canuck, which is being built in an unstated number, believed on good authority to be about 700. The aircraft is the heaviest fighter being built anywhere, according to Canadian govern-

> ment authorities, being heavier than a DC-3 transport and 21/2 times as heavy as the F-86E Sabre being built at Montreal. Production figures on the first two versions of the CF-100 are not available, and it is understood that 70 CF-100 Mark III have been ordered. The CF-100 Mark IV went into production some time in March. It will be equipped to fire 60 radar-aimed rockets, and will be the most heavily armed of any fighter. The prototype now being tested carries its rockets in two pods made from pressed paper. One pod is mounted on the tip of each wing. Once the rockets have been discharged the pilot can jettison the pods electrically from a button

> > (Turn to page 138, please)

General view inside the new Orenda jet engine plant near Toronto.





Furnace operator removing a guide tube from a small bar welded to the hoist hook of a loaded rack about to be removed from a furnace. This bar helps to guide the hook into the lifting loop of the rack.



By Merle W. McLaughlin Manager, Landing Gear Division, Willys-Overland Motors, Inc., Toledo, Ohio



General view of the heat-treating floor in the Willys-Overland plant for landing gear strut manufacture. All furnaces are Leeds & Northrup pit-type, electrically heated, and are operated by two men. High-heat row is shown at left, quench tanks in second row, draw furnaces in next row and cooling pits at right.

HEN Willys-Overland Motors, Inc., undertook the production of landing gear struts for Fairchild "Flying Boxcars" in one of its Toledo plants under contract with the Air Force, it was necessary to install excellent facilities for heat-treating the components manufactured.

Primary equipment for this heat-treatment includes six Leeds & Northrup Homocarb high heat pit type electric furnaces, six similar draw furnaces of the same make but for lower temperatures, four Bell & Gossett quench tanks, six pit-type cooling units that can also be used as furnaces, and much supplementary equipment. Included in the latter is an instrument and control room having chiefly Leeds & Northrup instruments with accessories and the same make of feed and controls for supplying to the furnaces the Homocarb fluid that is cracked in the furnaces to provide the necessary controlled atmospheres.

Pit-type furnaces were chosen, not only because they are well suited for the batch-type heat treating required, but because the installation had to be made in an existing building having less headroom than many heat-treating departments. Most of the furnaces and quenching equipment are located in a basement, with only the tops of furnaces and tanks above the floor made with removable steel plate panels.

This arrangement makes it possible to handle racks of parts by Cleveland tram-rail cranes equipped with Metior electric hoists. There is a crane for each long bay, and bridges between bays permit of transfer from one bay to the next, hence a load can be picked up at any part of the floor and quickly shifted to any other point in the department. If floor plates are lifted, any equipment within crane capacity can be picked up from basement locations and transferred by the cranes.

All parts heat-treated are of SAE 4140, 4130 (Turn to page 114, please)

Latest Features of

Pneumatractor equipped with the Sky-Worker that is being used for such work as aircraft repair and maintenance. Many other accessories can also be mounted on the tractor.

the Pneumatractor

ITH the recent redesigning of the Pneumapower Model 105-a six cyl gasoline engine and air compressor enbloc - Schramm Inc., West Chester, Pa., is able to provide the same high air delivery rate from the air compressor with a lower governed engine speed than the previous production model. Another development is the addition of a Diesel engine and power steering to the Pneumatractor line. The tractor consists of a Schramm engine-compressor unit, the rear axle and transmission of an International Harvester I-4 tractor, a special heavy cast frame, and an I-4 heavy-duty model front axle.

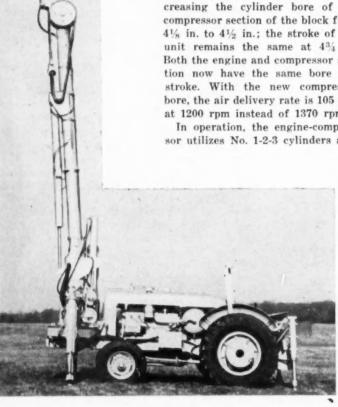
Major design improvement in the overhead valve six cyl Pneumapower engine-compressor consists of increasing the cylinder bore of the compressor section of the block from 41/8 in. to 41/2 in.; the stroke of the unit remains the same at 434 in. Both the engine and compressor section now have the same bore and stroke. With the new compressor bore, the air delivery rate is 105 cfm at 1200 rpm instead of 1370 rpm.

In operation, the engine-compressor utilizes No. 1-2-3 cylinders as a conventional internal combustion engine and the remaining three cylinders for the air compressor. Of course, the compressor end of the enbloc assembly uses a different valving arrangement than the engine section. Overhead poppet valves operated through conventional rocker arms, pushrods and tappets act as air intakes for the compressor, as shown in the accompanying illustration. The cam is of the double lobe type necessary for air intake on each down stroke of the piston. Discharge valves are of the spring loaded automatic type and, according to Schramm engineers, the springs are not affected by any temperature normally encountered in air compressor operation.

In the Pneumapower compressor, intake valve unloaders are used which hold the intake valves open during the unloaded period. Air from the pilot valve partially separates the two parts of the intake valve tappets and prevents the complete closing of the intake valves. The tappets are made in two sections, each section having three rings. A cushion is formed by the air between the two piece tappets which, under certain engine and compressor conditions, prevents the intake valve from fully closing and, therefore, unloads the compressor.

Since the Pneumatractor must be unloaded while operating as a tractor, lubricating oil from the regular lubrication system is put through a booster pump operating from the camshaft and is used to separate the unloader piston instead of air. While operating as a tractor, air pressure is normally not retained in the air receiver requiring the procedure outlined above.

Another feature of the engine-compressor unit is the special air governor, the Pneumastat, that controls the



Same High Air Delivery Rate with Lower Engine Speed, Power Steering, and the Option of a Diesel Engine Are Among Schramm's New Developments.

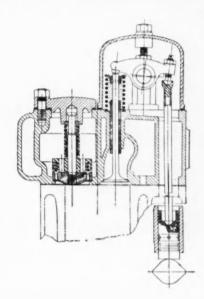
speed of the engine according to the amount of compressed air being used. When the demand for compressed air is less than the full capacity of the compressor, but more than 50 per cent of capacity, the Pneumastat varies the speed of the engine to produce exactly the required amount of air. When the demand for compressed air is less than 50 per cent of capacity, the pilot valve acts to unload the compressor and the air-governor slows the engine to idling speed.

Engine speed is controlled by a Pierce flyball type governor driven from the camshaft, until the air pressure has reached the point where the Pneumastat starts to function.

The Diesel engine being built by Schramm uses fuel injection with spark ignition, known as the Starr system. An American Bosch fuel injection system is used in conjunction with a Bosch magneto for the ignition system. Called the Dezoil, the engine has the same bore and stroke as the gasoline engine and delivers the same power.

Hydraulic steering used on the Pneumatractor consists of the usual pump, tank, servo valve and hydraulic cylinder. The cylinder is inserted in the steering mechanism and special brakets furnished with the unit. In response to approximately five lb pressure exerted on the rim of the steering wheel the Pitman arm ball stud actuates the servo valve, the double acting cylinder responding accordingly. The five lb pressure on the wheel is maintained at all times to give the operator the feel of the wheel.

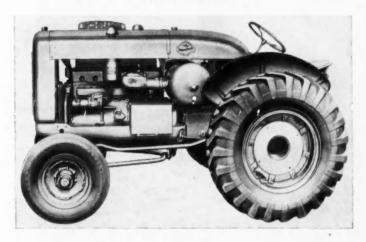
An integral relief valve protects the pump connecting lines and internal parts of the steering linkage form possible pressure overload damage. This relief valve can be adjusted to meet the maximum thrust required for any steering condition. Cross section of the valving used for the compressor section of the Pneumapower. The poppet valve is used for intake air while the spring loaded automatic valve is utilized for discharge air. Note the two piece tappet arrangement for unloading the compressor.



CONDENSED SPECIFICATIONS

	Engine	Compressor
Cylinders used	No. 1, 2 & 3	No. 4, 5 & 6
Cylinder bore	41/2"	41/2"
stroke	43/4"	43/4"
Piston displacement	226.6 cu. in.	151 c.f.m.
Actual air delivery		105 c.f.m.
Governed speed	1200 rpm	1200 rpm
Hp at governed speed	36	
Air receiver, size, in.		. 18 × 25½
Capacity, cu ft		
Gals		
Inlet diameter, in	2	
Outlet diameter, in.		

Schramm Pneumatractor self-propelled air compressor mounting the six-cyl gasoline engine and compressor enbloc. Conventional steering is used on this unit.



Versatile Tooling

for Making

Torsion Bars

An extensive facility devoted exclusively to the manufacture of torsian bars for military vehicles and other military applications is being operated by Maremont Automotive Products, Inc., in a self-contained plant in Cicero, Ill. The plant has a floor space over 70,000 sq ft.

By virtue of specialization, the Government thus has available what is said to be an unusually flexible and versatile establishment capable of producing the entire range of requirements for torsion bars, in a variety of sizes and design detail. In addition, the plant is fully equipped for conducting experimental work on new torsion bars and is capable of manufacturing experimental items and short runs with equal facility.

From the standpoint of industry interest this plant provides for the first time a unique facility for acquiring engineering and production know-how in torsion bar design. This organization could become an important contributor to the art if and when torsion

One of a battery of heavy duty, hydraulic type Barber-Colman hobbing machines used for cutting splines on the ends of torsion bars.



bar suspensions are considered practical for passenger cars.

Although Maremont is currently producing nine different types of torsion bars, in rights and lefts, in regular production, there is a general pattern of operations applying to all, regardless of type and size. These bars or springs range in size from 1½ to 3¼-in. diameter, and from 34 to 77½-in. in length. In addition, the company is constantly producing a variety of experimental samples for Army Ordnance.

A typical sequence of operations, applicable to most of torsion bar production, is given below to provide a visual picture of the nature of the facilities.

The basic operation starts with the upsetting of both ends of the bar stock in a Hill-Acme upsetter. As illustrated, the bars are heated, one end at a time, in the gas-fired furnace at the right, then brought to the upsetter. Each bar is heated twice and upset twice to produce the enlarged diameter at the ends.

Bars are machined all over in automatic lathes. Maremont has batteries of two different types of equipment for this purpose. The big model AP Lo-Swing lathes, one of which is illustrated here, have a 96 in. bed, and are employed primarily for machining large bars required in relatively short runs. These machines are fitted with a template attachment for profiling in an automatic cycle any required formation of the shaft between the upset ends. They have sufficient flexibility to handle any variety of types and sizes and lengths, in any quantity, since the machine can be readily changed from one job to another simply by replacing the template and making suitable adjustments in cutting tools.

The battery of heavy duty Sundstrand Automatic Lathes, on the other hand, is used primarily for the larger volume production runs where the fixed tooling can remain in place without change for longer periods. It is of interest that these lathes are fitted with solid triangular-shaped tool bits of Keenametal K-4 carbide, providing six sharp cutting edges without disturbing the tool setup. Stock removal not only is extremely rapid but is done on

an enormous scale. For example, it is estimated that on a 25% in. torsion bar about 24-lb of steel is removed, on the average.

Not only are the bars machined all over, they are also centerless ground all over. This is done in several stakes in Cincinnati Centerless grinders. Between the upset ends the straight section of the bar is ground to size in two stages—rough and finish—in Cin1 cinnati Centerless grinders, using throughfeed conveyors connecting the two operations. Through-feed, naturally, is responsible for speeding the operation materially.

Following this, the bars go to another group of centerless grinders for blending the profile between the straight portion and the upset end. This is done with special profiling wheels, handling each end separately.

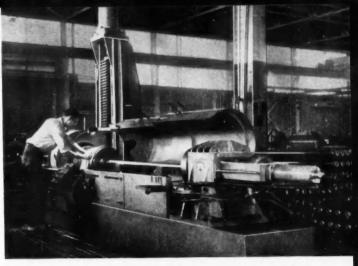
The splined ends then are hobbed in a large battery of heavy duty hydraulic Barber-Colman gear hobbers of latest type, as illustrated.

In an earlier operation, the bars were milled to length and drilled at both ends. Following hobbing, the drilled ends are tapped. The tapped holes not only are functional but are quite useful in connection with the heat treating operation that follows. Operators fit screw end hooks into one end of the bar, and these hooks then are used as a means of hanging the bars on the elevator mechanism of the heat treating furnace.

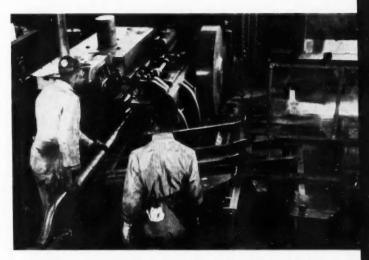
Illustrated here is the loading end of the group of Sunbeam Stewart furnaces for heat treating. It shows the automatically operated elevator mechanism which carries the bars in vertical position, keyed with the cycle of the furnace. Bars are loaded into the furnace from overhead as shown. The heat treating furnace which has a controlled atmosphere to prevent decarburization of the steel, heats the bars to a temperature of 1550 F. The time cycle is varied with the weight of the load.

At the end of the cycle, the bars are lowered automatically into an agitated and heated oil bath for quenching. The work then continues automatically from quench into a Stewart draw furnace where it is heated to around 800 F, to hardness range of 46Rc.

Following tempering the bars are straightened in big Hannifin presses. Straightness is held to a run-out not exceeding 0.012-0.015 in., primarily to meet the exacting requirements for the axial alignment of splined ends. Each bar then is given a Magnaflux

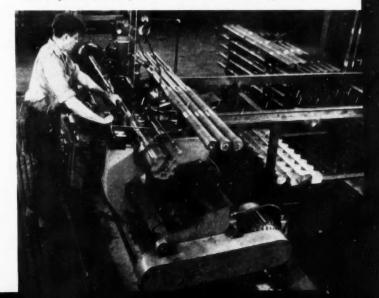


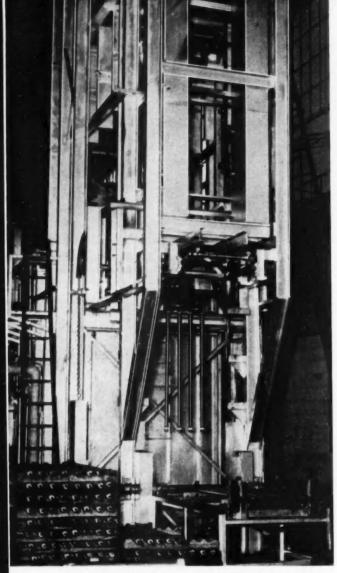
Here is one of a large battery of Yoder twisters for preloading torsion bars. These marchines are rated at one-million-in. Ib.



Hill-Acme upsetter is used at Maremont for upsetting ends of torsion bars. Bars are heated to forging temperature in the furnace at the right, one end at a time, and upset one end at a time.

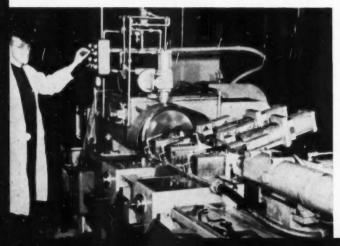
One of a number of Model AP Lo-Swing lathes, fitted with template controlled tracer for machining torsion bars. These automatic-cycle machines are particularly useful at Maremont for handling small runs, experimental bars, and extra long bars.





Here is the charging end of the Stewart heat treating furnace. Four torsion bars may be seen suspended from the conveyor in the foreground. The elevator mechanism, seen overhead, operates automatically to raise the load, transport it to an overhead charging door, and lower it into the furnace.

Close-up of one of a battery of heavy duty Sundstrand automatic lathes for overall machining of torsion bars. These are intended for relatively large runs, and teature fixed multiple tooling, employing solid triangular tool bits of Kennametal K-4 carbide.





Closeup of one of the Cincinnati Centerless Grinder operations on torsion bars.

inspection to assure freedom from even minute surface imperfections.

Next is a two-stage shot peening procedure in special American Wheelabrator machines. The first stage is the shot-peening of the entire shaft, using 0.041 in. rounded cut wire shot. However, Ordnance specifies a second shot-peening cycle on the splined ends to provide the necessary endurance value. To this end the bars go through another machine designed for shot-peening the splines only, this time using 0.021-in. cut wire to assure coverage of the involute spline fillets.

Last major operation is that of pre-setting or pre-loading the bars in torsion, according to Ordnance requirements which vary with each type and size. This operation is performed in enormous Yoder twisting machines, each one rated at one-million-in. Ib capacity. As in the case of metal cutting equipment, the Yoder twisters were selected to handle any bar size that might be required for military purposes. Depending upon individual part specifications, each bar is twisted from three to five times to the specified angular displacement. At the same time each bar is inspected meticulously for any evidence of discontinuities due to surface conditions or defects in the material.

When the bars are ready to ship, latest practice is to cover them all over, except splines, with a special approved adhesive tape supplied by Minnesota Mining & Mfg. Co., for preservation during shipment, in storage, and in use.

The foregoing covers briefly the highlights of a typical sequence of operations. Needless to say, with the background of mass production experience being accumulated at Maremont, the military establishment will profit by the improvements in techniques and manufacturing short-cuts that usually result from a well-operated plant.

SAE Aeronautic Meeting

Features

Production production procurement, machining, ma-

chine tools and tooling, titanium, jet engine buckets and blades, manufacturing management, inspection and quality control, large forgings and castings, and

precision forming and joining.

In addition to the several papers presented at the technical meeting, there were three confidential sessions, an exhibition of aircraft products, and the presentation of the Wright Brothers Award at the Annual Dinner. Recipient of the Award was W. J. Kunz, Jr., of Bendix Aviation Corp. He received the Award for his paper "A New Technique for Investigating Jet Engine Compressor Stall and Other Transient Characteristics" which was presented at the SAE Aeronautic Meeting last year. Another feature of this year's meeting was that the Air Force flew a number of the engineers to the Arnold Engineering Development Center, Tullahoma, Tenn., where they were shown the engine test facility, the gas dynamics facility, and the propulsion wind tunnel at the center.

Production Forum

At the production forum, the session dealing with experimental manufacturing concerned itself with quality control in experimental work, procurement, and money for research. It was felt by the engineers in attendance that procurement methods and the production requirements of an end product should be considered in the use of materials and methods of fabrication in building a prototype. The panel agreed that prime contractors should not lend funds to experimental sub-contractors for research work.

Production Procurement

Five basic subjects were discussed at the meeting on production procurement. One of the major items debated was the setting of responsibility between prime contractors and sub-contractors on the procurement of materials. Developing a source of materials and setting up a procedure for future procurement were talked over by the attendees. The panel also dwelled on over and under shipments and the use of business machines for procurement operations. Answers to most

Production Forum

of the questions presented to the panel depended on the type of company involved so no general rules were laid down.

Machining Panel

Cutting fluids were the major topic treated at the machining panel. According to many of the engineers, the use of a sulphur-based compound is considered good practice for the machining of high alloy material. The pros and cons of carbon tetrachloride and carbon dioxide were also debated as well as the use of waxes for aluminum work. Many production people felt that proper tool grinding for a particular job is one of the most important considerations. Two high-capacity machine tools were mentioned during the forum session. One, the Lapointe electric drive broach which operates at 120 fpm, was described in Automotive Industries, December 1, 1952, page 74. The other machine is a milling machine that has a feed of 375 ipm and a speed of 10,000 sfpm.

Machine Tools

The need for larger machines which will deliver heavier cuts and higher feeds was discussed at the machine tools and tooling session. There were many complaints registered against foreign tools which are being used by many aircraft companies. "Not enough horsepower" and "Not rugged enough" were two major criticisms which added up to the fact that the tools were not suitable for high or heavy production work. Concerning the U.S. machine tool builders, the aircraft manufacturers say that the tool builders should design equipment to an aircraft firm's specifications. In answering this, the machine tool makers stated that the development costs are extremely high and that some aircraft concerns want too much in the way of special equipment. One aircraft producer stated that the use of optics on foreign equipment was advanced farther than U.S. practice, but that several American manufacturers were working on the problem.

(Turn to page 122, please)

What's NEW at the

MATERIALS HANDLING SHOW

PHILADELPHIA

MAY 18th-22nd

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73

Gas-Electric Fork Lift Truck

Development of what is claimed to be the first gas-powered industrial truck with electric transmission has been announced and will be shown for the first time at the Exposition. Named the Dynamotive, it features radical changes both in design and appearance. The gas-powered, electric driven truck offers an electric, infinite step transmission which has no mechanical connections from engine to drive unit.

Electric transmission is said to provide fully controlled power and infinite acceleration range with minimum power loss.

There are several advantages gained from the Dynamotive's modern design, according to the maker. Greater safety and driver comfort result from such styling innovations as greater vision from the driver's seat; a full-size bench-type seat; extra leg room; centralized controls; and grouping of all instruments on the steering post column. Rear contours have been shortened, reducing aisle projections and contributing to over-all operating efficiency as well as appearance.

An unusual safety feature is provided in interlocking the hydraulic service wheel brakes with emergency disk brakes in such a manner that instantaneous application of the emergency brakes is attained by the same pedal in case of hydraulic brake failure.

Ease of maintenance and exceptional accessibility of engine also are said to result from design and styling factors.

All parts not requiring quick or frequent access are shielded, for cleanliness, and at the same time providing protection against damage. For servicing, the hood hinges forward disclosing the entire engine compartment. The truck is extremely low in chassis height, with heavier sections at the bottom.



Automatic's latest industrial truck, the Dynamotive.

Gauges on the cluster-type instrument panel measure amperage, temperature, oil pressure, and fuel level.

A new optional feature is a load indicator, showing weight of material on the truck's forks at any given time. This will prevent overloading past capacity, another safety factor. Capacities of the Dynamotive range from 4000 to 6000 lb.

Heights of telescoping lifts are 124 in. with a standard 83 in. over-all height, for either mono-lift or duolift models. Automatic Transportation Co., Booth 1308.

Circle M-1 on page 73 for more data

Tractor Mounted Hydraulic Crane

To be placed on display is a tractor mounted hydraulic crane having capacity up to 8000 lb at an eight ft radius. The crane is completely hydraulic and it features turntable rotation, boom elevation, raising and lowering of cable and hook, and power extension and retraction of boom. The telescopic boom can be raised from the horizontal to an approximate 40 deg angle or any intermediate point, and is continuously rotatable through a full 360 deg.

The tractor has hydraulic steering with the front wheels power booster steered, while the rear axle has a straight hydraulic lever actuated steering control. It can be equipped with either a gasoline or Diesel engine. Austin-Western Co., Sub. of Baldwin-Lima-Hamilton Corp., Booth 1112.

Circle M-2 on page 73 for more data



Austin-Western tractor mounted hydraulic crane.

Crawler Fork Lift

Two unique crawler lift trucks, called Terra-Lift, will be displayed.



American, Model M-2 Terra-Lift.

These vehicles, Models M-2 and M-4, have a 2000 lb capacity and 4000 lb capacity respectively. The units can be readily converted for use as a bull-dozer, angledozer, and snow plow.

Turning radius, over the forks, of the M-2 model is 10 ½ ft and the unit is capable of turning intersecting aisles with a width of eight ft. A Continental F-124 gasoline engine with four cyl and a total displacement of 123.7 cu in. is utilized. American Tractor Corp., Booth 926.

Circle M-3 on page 73 for more data

Remote-Controlled Electric Trucks



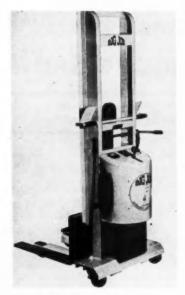


Radio remote-controlled materials handling trucks will be in operation at the Show. Models will include the Tractor Ox, Power Ox and the Pallet Ox. The illustration depicts an operator controlling the track movement by a small control unit attached to his belt. He may move the truck forward, backward, or around corners without going to the tractor. The operator may, if desired, control the tractor in the conventional manner. (Barrett-Cravens Co., Booth 1350.)

Circle M-4 on page 73 for more data

Hydraulic Lifts

Several models of hydraulic lifts for either manual or battery operation will be introduced at the Exposition. The lifts have a straddle type base that can be furnished in a range of widths up to 50 in. Forks, adjustable in any position, to widths that provide the best support for the load, are furnished in lengths from 25 in.



Big Joe hydraulic lift truck.

to 36 in. and load at floor level. Swivel casters are placed at rear and roller bearing wheels in front. Dual ground gripping brakes, fitted with brake shoes, are operated by a single hand lever. Big Joe Manufacturing Co. Booth 1434.

Circle M-5 on page 73 for more data

Gasoline and Diesel Fork Lift Trucks

A maker will exhibit and demonstrate at the show a complete line of the latest production models of fork lift trucks and industrial tractors. These will be both gasoline and Diesel powered and many will be equipped with torque converters. One of these, illustrated, is the FTD40-24 Diesel powered, 4000 lb capacity at 24 in. load center. It has cushioned tires, standard forks, and a revolving carriage. The Buda Co., Booth 202 & 1425.

Circle M-6 on page 73 for more data



Gasoline and Diesel Fork Lift Trucks

Future Fork Truck

The latest addition to the Powrworker line of industrial trucks is the telescopic tilting fork stacker in four base capacities of 1500 lb, 2000 lb, 2500 lb, and 3000 lb, all rated at 24 in. center line of load.

Two standard models are offered in each capacity incorporating the Hi-Lo stack feature. One has an 83 in. overall height with 64 in. of free lift and 130 in. maximum lift. The other, especially designed for highway truck loading, has a 68 in. overall height with 49 in. free lift and a maximum lift of 100 in.



Clark Powrworker.

In addition to the display of new equipment the "Fork Truck of the Future" will be unveiled at the show.

Labeled "X-70" throughout design and engineering stages, this model will highlight the comprehensive display of trucks. It has been built as an exploratory development to get customer reaction to its many features. Therefore, it is not being offered for sale under any conditions or circumstances.

Clark Equipment Co., Booths A, B, & 1600.

Circle M-7 on page 73 for more data

(Turn to page 62, please)

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 61)

Gasoline-Electric Cranes

Two recently developed cranes, 7½ and 12 ton models, will be displayed for the first time. These cranes feature gasoline-electric control. A special feature will be the automatic safe load indicator, which has been designed to eliminate the possibility of lifting loads higher than the rated capacity of the crane. The cranes are equipped with power assist steering. They also have a short wheel base and the boom is of the cantilever type. Coles Cranes, Inc., Booth 1333-B.

Circle M-8 on page 73 for more data



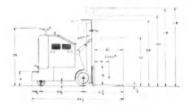
Cales crane of the 71/2 ton and 12 ton type.

2000 Lb Capacity Lift Truck

The recently developed Model F-38T, 2000 lb capacity at 15 in. load center, lift truck will be displayed. This electric powered model is of the three wheeled, end control, stand-up, full telescoping type. Major design features include caster type single wheel steer, completely non-reversible steering, center sill frame, full initial lift, worm drive, single travel and

direction control handle. The truck is said to be designed for high speed handling in congested areas. It has a short wheel base and 360 deg turning. Elwell-Parker Electric Co., Booth 1233.

Circle M-9 on page 73 for more data



Elwell-Parker, Model F38T.

Lift Trucks



Recently placed in production and to be exhibited at the show is a line of heavy-duty lift trucks: Gerlinger Carrier Co., Booth 1014.

Circle M-10 on page 73 for more lata

Four Lift Trucks

Four lift truck models, never before shown, will make up part of the maker's exhibit at the show. These models are the YC-40, UC-30, XA-60, and ZA-80. The YC-40 is claimed to be by the maker the smallest and



Hyster, Model YC-40

lightest 4000 - lb capacity lift truck. It is said to include many advanced features in lift truck designing and engineering. The UC-30 is a 3000-lb capacity version of the YC-40. Both trucks have heavy duty industrial engines and cushion type tires. The ZA-80 is an 8000-lb capacity model while the XA-60 is a heavy duty version of the ZA-80. Both are mounted on pneumatic tires and have heavy-duty industrial engines. The XA-60 and the ZA-80 were designed small and compact so that they can be used efficiently on many jobs found both inside and outside. Hyster Co., Booth 1206.

Circle M-11 on page 73 for more data

Light-Weight Materials Handling Truck

The Xpediter material handling truck, to be shown, is claimed to combine the convenience of the hand truck with the utility of power and speed and is designed for various handling duties. Its compact construction, small turning radius and front wheel steering is said to enable the Xpedister to move through narrow aisles. Its light weight permits use on elevators and floors not adapted for



Kalamazoo Xpediter

heavy units. The truck is offered in six models—hydraulic and manual lifts—to handle materials up to 800 lb at a 12 in, load center.

It utilizes a Wisconsin AEN, 7.5 hp, four cycles, aircooled, three in. bore, 3¼ in. stroke engine equipped with impulse coupler magneto ignition, governor, and oil bath air cleaner. A foot pedal controlled forward and reverse transmission is supplied with multiple disk clutches running in oil. The two wheel drive rear axle has an automotive type differential. Kalamazoo Manufacturing Co., Booth 1537.

Circle M-12 on page 73 for more data

Saddle-Type Stacker



The 2000 lb capacity Hydrolift, which will be exhibited, can be used for handling pallets, skids, dies, drums, barrels, sacked goods, and for numerous other non-routine jobs. For occasional long hauls, a coupling can be provided on the Hydrolift for movement with a small powered tractor. The Hydrolift will stack in a five ft aisle. Lift Trucks, Inc., Booth 137.

Circle M-13 on page 73 for more data

Sit-Down Fork Truck

Model 430 "Yak" fork truck, a 4000 lb capacity sit-down truck featuring many improvements in performance and construction, will be exhibited.

Maximum fork elevation has been increased 16 per cent to 130 in. Free lift was 25 in., is now 58 in. Travel



Mercury, Model 430.

speed is now 6.5 fpm, up 18 per cent. With its outside turning radius shortened to 79 in., the truck is now able to right-angle stack in 10½ ft aisles with 36 in. long loads. For economy of operation, chassis weight has been reduced seven per cent to 7925 lb.

Construction-wise, the "Yak" features: a simplified hoisting mechanism, an all-new drive assembly, improved travel controls, a new steering axle, and an improved frame. Mercury Manufacturing Co., Booth 1533.

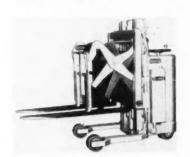
Circle M-14 on page 73 for more data

Electric Tiering Truck

An electric tiering truck with forks that has been recently designed will be on exhibit at the Show. Called the Reach-fork, it will right-angle tier from any six-ft aisle due to its unique fork action, short length and off-set drive wheel with 200 deg turning arc. Its forks extend 24 in. and back in just a few seconds' time.

The Reach-Fork will handle pallets of any size without necessitating changes in the truck. It enables pallets to be stacked close together since no space is needed between loads to accommodate the base forks. The truck is designed with a 51 in. free lift and has a capacity of 2000 lb. Raymond Corp., Booth 1426.

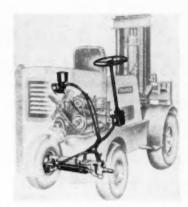
Circle M-15 on page 73 for more data



Raymond Reach-Fork.

Power Steering for Fork Lift Trucks

Introduction of hydraulic power steering for a line of fork lift trucks has been announced in time for the show. To be displayed for the first time, this development is said to offer quick and easy turning at low speeds of pneumatic and solid tired lift trucks. A full turn of the wheels from sharp right to sharp left can be made in five sec with steering effort reduced 80 per cent. This feature coupled with considerably reduced road shock in turn is claimed to reduce driver fatigue appreciably.



Towmotor power-steering equipped lift truck.

Another important benefit gained through installation of power steering is lessened wear and tear on the steering gear and drag link, according to the maker. Townotor Corp., Booth 1325.

Circle M-16 on page 73 for more data

Heavy-Duty Fork Lift Trucks

To be displayed at the Show is the "Power King" series, a recent addition to the Tracto-Lift line of heavyduty fork lift trucks. The three power King models have more than twice the capacity of standard models.

The design features over-size pneumatic tires on a basic tractor unit. Because of its design, it has the ability to travel at tractor speeds, has maximum maneuverability, ample underneath clearance, climbing power, and adaptation of the principle of flotation for travel in sand and mud.

One of the features includes an operator's protective guard. Lifting



Tracto-Lift heavy-duty fork lift truck.

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

capacities on Power King models are from 10,000 to 15,000 lb. Fork lengths range from 36 in. to 108 in. in six in. variations. These trucks climb up to 20 per cent grades, have six speeds forward and reverse, and 12 in. underneath clearance. Tracto-Lift Co., Booth 628.

Circle M-17 on page 73 for more data



Anthony lift gate.

safety by-pass in one unit, dual safety latches and automatic lock. Anthony Co., Booth 620.

Circle M-19 on page 73 for more data

Radio Equipped Fork Truck

An electric fork lift truck, 3000 lb capacity, will be equipped with a two-way radio. This truck will be on display and will be demonstrated at the Exhibition. Yale & Towne Manufacturing Co., Booth 248.

Circle M-18 on page 73 for more data

Radio Equipped Fork Truck.

Lift Gates

A full size working model of a recently announced lift gate will be on display. The lift gate features the availability of a model with 4000 lb lifting capacity, and a variety of longer platforms for pallet loading on trucks. Other features include: lightweight, one control lever, one hydraulic cylinder with control valve and

Power-Driven Conveyor

On exhibit for the first time will be the Apron Veyor which was designed for the metalworking industries. This unit is designed with a horizontal apron three ft long and 12 in. high that will extend under metalworking presses and convey out horizontally to the outside of the press and then up the incline portion of the bed of the unit into storage bins at the next press.

The conveyor will be available in



Arrow Apron Veyor.

12 in. and 16 in. belt widths and six ft and eight ft lengths, with ½ hp motors, either one or three phase a-c. Arrow Products, Inc., Booth 444.

Circle M-20 on page 73 for more data



Reinforced Tape Dispenser

Now available as a reinforced tape cutting dispenser is the Tape-Shooter 100-A which will be demonstrated at the maker's booth. Better Packages, Inc., Booth 502.

Circle M-21 on page 73 for more data

Stabilized Overhead Crane

A Tramrail stabilized crane which is said to eliminate the usual swinging of a load being hoisted or transported from one area to another will be featured in the maker's exhibit. It is claimed to be an aid in speeding tank-dipping operations such as anodizing, chromodizing and similar plating operations. In various assembly operations it is helpful since parts or assemblies being worked on can be



Cleveland no-swing crane.

held solidly in position. It makes possible the delivery of hot metal in a foundry by an automatic dispatch method direct from cupola to molding area.

The crane has an arrangement of hoisting ropes which form a triangular suspension. Thus, according to the maker a load can be raised or lowered through a considerable distance and yet with nothing more than the hoisting ropes supporting it, will remain rigid. Cleveland Crane & Engineering Co., Booth 1325A.

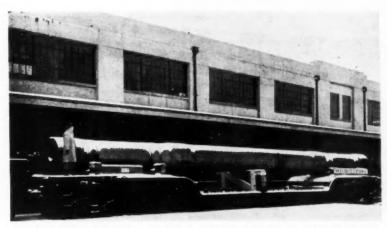
Circle M-22 on page 73 for more data

(Turn to page 164, please)

News of the MACHINERY INDUSTRIES

By Thomas Mac New

Record Industry Expenditures for New Capital Equipment Foreseen for 1953. Canada To Hold Largest International Machinery Show.



This 152-ton tie rod is the first of 12 similar rods which will be used on the 35,000 ton and 25,000 ton closed-die forging presses being built by the E. W. Bliss Co., Canton, Ohio. Forged from a 250-ton billet by the Bethlehem Steel Co., the rod is 70 ft long and has a maximum diameter of 47 in., with an 18 in. hole bored through its entire length.

Armament Tooling Down Civilian Tooling Up

A marked decrease in armament tooling requirements during the last month or so and a corresponding upsurge in special tooling for civilian products was reported at the recent National Tool and Die Manufacturers Association annual Washington meeting. From a ratio of 80 per cent defense and 20 per cent civilian tooling six weeks ago, the average in tool and die shops throughout the country today is 40 per cent defense and 60 per cent civilian business.

New tooling orders flowing into contract tool and die shops indicate that automotive producers will be vying for the consumer dollar with products that are newer, better, and less expensive, it was pointed out by Philip R. Marsilius, vice-president, Producto Machine Co., Bridgeport, Conn. He predicted intensive design competition by the manufacturers during the latter part of 1953 and throughout 1954.

Capital Outlay Record?

Industry expenditures for new capital equipment in 1953 may well reach a record amount according to

the Council for Technological Advancement. Sustaining factors for continued high levels of capital outlays are discussed by the Council in an analysis of the current outlook for capital goods markets.

The Council points out that present anticipated capital expenditures generally reflect a strengthening of investment intentions as compared with predictions reported earlier this year and in the latter part of 1952.

A joint Commerce Department-SEC survey of current anticipated capital expenditures points to an outlay of \$1.3 billion in 1953 for all types of machinery, an increase of \$600 million over 1950 and \$100 million over 1952.

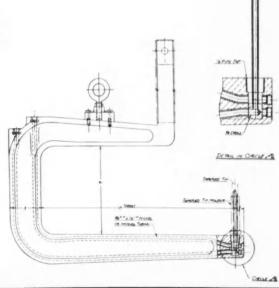
Nickel Tubing for Spot Welding Machines

Electrode tips for spot-welding machines are subjected to terrific heat and can readily burn up unless cooled by a steady flow of water. For this application, nickel tubing was selected since the tubing must be embedded in the casting of the welding arm or yoke.

The unit, illustrated in Fig. 1, is one of many types put out by Phila-

(Turn to page 188, please)

Fig. 1 — Line drawing of the spot-welding yoke showing the nickel tubing used for the water lines.



EQUIPMENT PLANT - PRODUCTION

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73

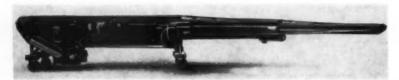
Adjustable Length Conveyors

Double-boom Adjustoveyor is a recent addition to a line of adjustable length conveyors. The unit is designed for heavy-duty applications requiring heavy load carrying capacities, and has the unique feature of increasing its open length 220 per cent over its closed length.

The double-boom Adjustoveyor will assume many different positions and lengths, and is completely counterbalanced.

Construction features heavy truss design, to carry loads of 50 to 100 lbs per linear ft, depending on the model. The power-operated double-boom will carry full loads over its entire length, even when completely extended. Models are available from 8 ft to 25 ft closed, and from 16 ft to 61 ft open, and can be operated at any boom extension distance in between. Length of boom extension can be varied at will, with instantly operating in-out buttons at each end of the Adjust-oveyor. The unit is available with fixed height legs, or adjustable legs that will allow elevations for stacking up to 30 deg. Belt speeds are variable, either forward or reverse. Stewart-Glapat Corp.

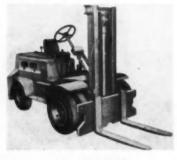
Circle E-1 on page 73 for more data



Stewart-Glapat Adjustoveyor.

Improved Fork Truck

A three-speed transmission and a new-style fork mounting plate assembly has been incorporated in an improved Yardlift-60 fork truck. Speed ratios between 1st, 2nd and 3rd gears



Clark Yardlift 60

at gear-changing speeds are considerably less than with the former two-speed transmission. In addition, the use of an intermediate gear permits a lower 1st-gear ratio. The low-speed gear in the transmission has doubled the power of the Yardlift-60 enabling it to climb a 24 per cent grade under full load. The transmission will be used only in the friction-clutch model. The Dynatork Drive also is available in the Yardlift-60 models.

The fork mounting is approved and recommended by the Industrial Truck Association. It is designed for greater interchangeability of attachments and devices between all makes of trucks with comparable capacity. Clark Equipment Co.

Circle E-2 on page 73 for more data

Load Stabilizer

An hydraulic-powered load stabilizer, an attachment for Elwell-Parker fork trucks with capacities up to 6000 lbs, has been introduced.

The unit is specially designed for safe transportation of unstable and semi-stable loads; it is also designated for stable loads which are subject to rough travel where they might be bounced off the skid or pallet on which they ride. In addition to carrying loads more safely, the stabilizer is said to allow fork truck operators to stack at great heights.

Fork trucks, which accommodate the stabilizer, are standard vehicles; the only alteration is to the hydraulic system to regulate the operation of the attachment. The shape or size of the stabilizer plate may be altered to meet specific loads. Usually, the plate is faced with steel although it may be faced with rubber or wire mesh if desired.

The distance between the forks and the stabilizer plate is 41% in. min-



Elwell-Parker load stabilizer.

imum, 75 in. maximum. The stabilizer is powered by an hydraulic cylinder with a pair of telescoping guides. Clamping pressure can be varied within limits of 150 to 1350 psi. An hydraulic pressure blow-off valve is part of the system to prevent crushing the load due to excessive clamping after the pressure has been set. The Elwell-Parker Electric Co.

Circle E-3 on page 73 for more data (Turn to page 68, please)

AUTOMOTIVE INDUSTRIES, May 15, 1953



WHAT <u>life-line</u>, REALLY DELIVERS
IS MORE SERVICE . . . LESS SERVICING

Life-Lines are pre-lubricated... need no further lubrication. Write for "Facts on Pre-lubricated Bearings" B-4378. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

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Westinghouse



EQUIPMENT PLANT - PRODUCT

For additional information, please use postage-free reply card on page 73

(Continued from page 66)

Line of Surface Grinders Feature Versatility

DoAll D6 surface

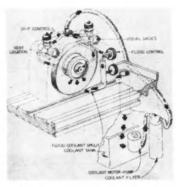
grinder.

Recently placed in production are the Model D6 line of surface grinders which have been designed to receive attachments or incorporate additional components that greatly broaden the scope of surface grinder applications. Versatility has been emphasized in the design of the equipment.

Of interest is the design of the coolant system which affords control for the selection of one of three cooling methods, Cool Grinding, flood cooling, and a combination of Cool Grinding and flood cooling. In the Cool Grinding system, the coolant is fed through the wheel in large volume and under pressure; coolant is then recirculated. Coolant control is achieved through a manifolded wheel guard. The manifold supplies three

Another feature of the tool room surface grinder is the completely adjustable wheel guard. Full hydraulic cross feed is standard on the machine. DoALL Co.

Circle E-4 on page 73 for more data



Operation of the D6 surface grinder.







Globe dipping tank for plastics

Line of Production Dipping Tanks

Recently announced is a complete line of production dipping tanks for Plastic Seal hot dip protective coatings. Five standard models in the line range from eight in, by four in. by six in. up to 13 in. by six in. by 18 in. according to the manufacturer.

Positive agitation is created by the impeller type agitator, and it contains special heating elemens which radiate heat to the sides of the tank. Positive agitation is said to eliminate surface congealing caused by ambient air. maintains transparency and color over longer periods, and gives a constant level in the dipping area for mechanical conveyor dipping operations. The impeller overload switch automatically shuts off the impeller

when necessary to perform this task.

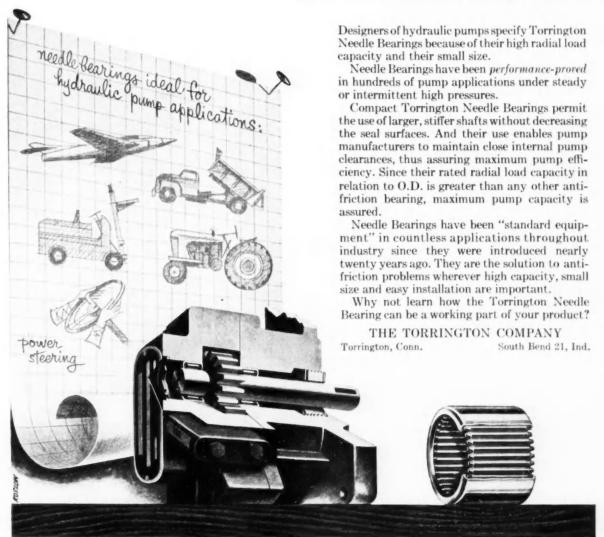
The production dipping tank is equipped with a Robertshaw thermostat that controls the plastic heat manually. There is also contained in the unit a second Fenwall switch which will automatically shut off the tank to prevent burning of plastic if the manual switch is left on.

This latest design is claimed to reduce normal six to eight hr melting time down to less than two hr on a 44-lb capacity tank. Tanks are available in a range of capacities from six to 1225 lb of plastic per load and can process as high as 2500 lb per eight-hr shift. Globe Imperial Corp.

Circle E-5 on page 73 for more data (Turn to page 70, please)

Need a high capacity bearing with small size?

here's how hydraulic pump manufacturers get it with NEEDLE BEARINGS



TORRINGTON NEEDLE BEARINGS

Needle . Spherical Roller . Tapered Roller . Straight Roller . Ball . Needle Rollers

Trade-marks of some of the leading hydraulic pump and motor manufacturers whose products enjoy the benefits of Needle Bearings.



















For additional information, please use postage-free reply card on page 73

(Continued from page 68)

Gage Segregates Pistons in Eight Classes



Sheffield piston gage.

A piston gage, now available, provides simultaneous gaging of piston skirt diameter at two places, of taper from top to bottom, and of the cam grind on the skirt at three points. In measuring the diameter, the Precisionaire also indicates in which one of eight classifications the piston belongs.

On the model illustrated the difference between one piston class and the next is only 0.0002 in. The gage consists of a chrome plated ring containing a number of air jets and two

Plunjets connected to a five column Precisionaire.

The operator inserts the piston into the gage with the head up. Instantly the position of the floats in the glass columns indicate whether or not the piston is dimensionally correct. Cam grind is checked at points 20 deg and 90 deg on each side of the major axis at the bottom of the skirt. Taper is measured between the upper and lower skirt diameters by comparison of two float positions. Sheffield Corp.

Circle E-6 on page 73 for more data

Special Tool

A special adaptation has been engineered combining boring, counterboring and facing blades with conventional tap chasers in a seven in. ALT tap head,

The work piece is bored, counterbored and faced with the tap chasers collapsed. Upon completion of this operation the tap is withdrawn from the work piece and the tap chasers are expanded. The thread is then tapped on the surface previously bored. Landis Machine Co.

Circle E-7 on page 73 for more data



Landis special tool.

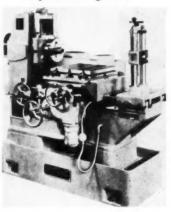
Fork Truck



A 6000-lb gas-powered fork truck on pneumatic tires has been brought out. Designed for indoor-outdoor handling operations, the Series 6 features: Hoist cylinders and chains located within the side members of the tower. Four speeds torward, four reverse. Same tire sizes front and rear. Planetary gear drive in the wheels. (Ross Carrier Co.)

Circle E-8 on page 73 for more data

Optical Jig Mill

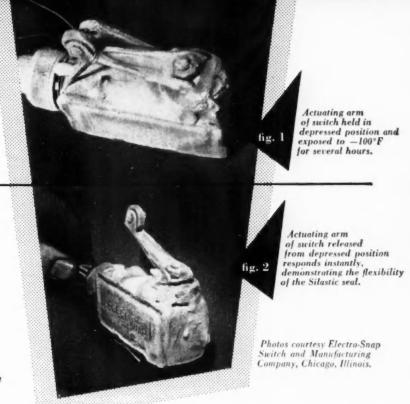


The Keans Optimetric jig mill is now being made available to the American market. A compound table supporting a detachable revolving table slides on the main bed is a central thrust type of upfeed motor. At the left hand end of the main bed is a central thrust type of upright which carries the vertically adjustable spindle slide. The spindle is driven by a 1½ hp a-c motor in the base. Special ways are provided on the bed for supporting the boring stay which is also of the central thrust type, and the stay bearing has the same vertical traverse as the spindle slide.

The compound table has three reversible power feeds to transverse and longitudinal motions, given by a constant speed 1/4 hp motor. Fine and coarse hand feeds with independent hand wheels are provided to both directions. (British Industries Corp.)

Circle E-9 on page 73 for more data (Furn to page 186, please) As a flexible seal for limit switches exposed to weathering and temperatures below -100°F, Silastic works where other materials fail.

Reliability is imperative in hermetically sealed limit switches used to control such aircraft parts as landing gear, bomb bay doors, turrets and flaps. Evaluation tests conducted by Electro-Snap engineers showed that Silastic was the only material flexible enough at extremely low temperatures to serve as a diaphragm-type wobbling seal. Faultless performance for over a million test cycles plus qualification under government specifications prove the excellence of the design and the superiority of Silastic.



for superior performance specify

the Dow Corning silicone rubber

Silastic stocks designed for extreme temperature applications are the only materials that will retain rubbery properties after continuous long term exposure to temperatures from -80 to 300-350°F or after repeated short term exposure

to temperatures from -130° to 500°F.

MODULUS RATIO TEMPERATURE 70 40 10 +20 +50 +80 TEMPERATURE "F

As a standard for low temperature performance, we call your attention to our data1 on modulus ratios, or relative stiffening, as measured by the Gehman test method. According to these data (see Figure) the modulus for Extreme Temperature Silastic shows no appreciable change above temperatures in the range of -112 to -130°F. Rapid change in the modulus for natural rubber and for most silicone rubber stocks takes place between -40 and -70°F.

All types of Silastic show excellent resistance to oxidation, weathering and to a variety of hot oils and chemicals. Silastic stocks for electrical applications are unique even among silicone rubbers for low water absorption and excellent dielectric properties combined with good physical strength.

Data and actual performance prove that you can count on Silastic to retain both its physical and dielectric properties after long exposure to outdoor weathering or to temperatures far above and below the limits of natural or synthetic organic rubbers.

Polmanteer et al, Ind. and Eng. Chem. Vol. 44, Page 1576, July 1952, *T.M. Reg. U. S. Pat. Off.

Atlanta Chicago Cleveland Dallas New York Los Angeles Washington, D. C. (Silver Springs, Md.)



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Silastic Facts 10a, properties and applications of Silastic stocks and pastes. Please send me:

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NEW PRODUCTS_

FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73



Versatile Hydraulic Hoist for Many Jobs

Recently marketed is a hydraulic hoist, which reportedly will lift and swing from 1000 to 2000 lb, pull up to 5000 lb, snake, drag, dig, and dump. It is designed primarily for service on trucks and tractors.

The hoist is usually powered by a single-speed takeoff unit from the truck (or tractor) engine which drives a hydraulic pump through connecting drive shaft and universal joints. However, it operates well stationary also.

The unit has no chains, sprockets,

drums, rachets, or brakes, and can be operated by one man. It is attached to any truck bed by U-bolts without structural alterations.

The boom comes in two sizes, adjustable to lengths of three ft, 10 in., eight ft, three in., and 11 ft, eight in. If power shutoff occurs during operation, the unit stops reportedly without dropping the load, and control valves can be set for any lowering speed. Hiab Div., Larson & Co.

Circle P-5 on page 73 for more data



Air Exhaust Muffler Checks Noises and Mists

Now available is an air exhaust muffler designed to check noise and vapor mists of car lifts and other airoperated equipment. It is claimed that the unit reduces safety and health hazards and eliminates mists.

The muffler silences exhaust air noises by dissipating the exhaust energy in a radial-flow pattern. Air entering the muffler is trapped by the inlet chamber creating an air cushion to absorb initial exhaust impact. The flow is broken into a series of streams which strike the disseminator in a criss-cross pattern.

The unit is available in pipe sizes from ½ to two in., with outside diameter at 1% in., and length from 3½ in. to 9 in. Allied Witan Co.

Circle P-6 on page 73 for more data



Self-Locking Spring-Pin Fastener

Now available is a self-locking, spring-pin fastener to replace tapered, grooved, and dowel pins in all kinds of assemblies. Called the Sel-Lok spring pin, it is vibration-proof, absorbs shock, is easy to insert and remove, and eliminates reaming.

The unit is available in diameters from 1/16 to ½ in. and in a wide variety of lengths. Carbon and corrosion-resistant steel and, as specials, copper and aluminum alloys are used. Standard Pressed Steel Co.

Circle P-7 on page 73 for more data



Coil Grabs for Easy Lifting and Lowering

Recently introduced are two coil grab models of 5000 lb capacity each. One grab is designed for normal width coils up to 12 in, wide and the second for coils up to 24 in, wide.

It is claimed that one operator can lift a coil from the pallet up to a vertical position in one easy motion. The units are also designed for picking up coils from a vertical position and laying them down on a pallet.

A prong tapered to fit between the

coils, in the space made by the coil bands, is positioned while the opposite jaw is placed in the center of the coil. As the crane lifts, the grab adjusts to the coil size. As the coil lifts, the grab turns to allow the coil to move to a vertical position. A safety lock is included in the design to keep a sturdy grip on the coil. Dixon Automatic Tool, Inc.

Circle P-8 on page 73 for more data (Turn to page 136, please)

INFORMATION SERVICE

Postage-Free Postcards Are Provided Here for Your Convenience to Obtain FREE LITERATURE and Additional Information on NEW PRO-DUCTION AND PLANT EQUIPMENT, AND NEW PRODUCTS Described in This Issue of AUTOMOTIVE INDUSTRIES. Please Circle Code Numbers of Items in Which You Are Interested, Print Name, etc., and Mail Promptly for Quicker Service.

USE THIS POSTCARD

FREE LITERATURE

Motors and Controls for Machine Tools

Recently published is a complete machine tool electrical handbook for the selection of motors and controls. Distribution of this book is limited, and requests for copies must be made on company letterheads with job title of the writer included. Westinghouse Electric Corp., P. O. Box 2278, Pittsburgh 30, Pa. Booth No. 1333-A

Stapling Machines

Ready for distribution is material on a line of heavy-duty air and handoperated stapling machines for both packaging and production use. Powers Wire Products Co. Booth No. 107

Circle L-1 on postcard for free copy

Bin-Feeding Device

Recently made available is a leaflet on the PneuBin device for feeding materials from bins and hoppers by positive displacement. Gerotor May Corp. Booth No. 917

Circle L-2 on postcard for free copy

Safety Grating

Recently released is a booklet describing a new type of safety grating for running boards, steps, and walkways. Grip-Strut Div., The Globe Co. Booth No. 828

Circle L-3 on postcard for free copy

Engine Line

Ready for distribution are the following bulletins: No. 846-V on Model FC four-cyl gasoline engine; No. 1079, a power rating chart for various units; No. 1409-A on Model 180-DAC four-cyl Diesel: No. 1617 on 135-DKBS supercharged Diesel; and No. 1624 on 195-DLCA and 195-DLC Diesel sixes. Waukesha Motor Co. Booth No. 729

Circle L-4 on posteard for free copy

Industrial Truck Facts

Now available in more complete and up-to-date form is a reprint of the industrial truck specifications appearing in the March 15, 1953 issue of this publication. Automotive Industries, Booth No. 239

Circle L-5 on postcard for free copy

Electric Motors

Bulletin 100 describes a series of 1/30 to five-hp motors for standard and special application designs. Doerr Electric Corp. Booth No. 609

Circle L-6 on posteard for free copy

Dock Board, Ramps

Now available are circulars on the Herco four-way adjustable dock board and the Leitelt twin-screw and hydraulic power ramps. Karl A. Herman Co. Booth No. 328

Circle L-7 on postcard for free copy (Please turn page)

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Fibre Products

Catalog No. 49B covers a line of trucks, tote boxes, trays, cans, and barrels made from hard vulcanized fibre. Fibre Specialty Manufacturing Co. Booth No. 440

Circle L-8 on postcard for free copy

Industrial Casters

Ready for distribution is a specifications sheet on Series 12 and 13 industrial casters for light and medium duty. Albion Industries, Inc. Booth No. 815

Circle L-9 on posteard for free copy

Weighing-Recording Units

Now available is a brochure on the Ametron electronic crane scale and remote indicating units. Streeter-Amet Co. Booth No. 1848

Circle L-10 on posteard for free copy

Industrial Doors

Now available is a leaflet which describes a line of Prest-O-Matic industrial doors. Clark Door Co., Inc. Booth No. 141

Circle L-11 on posteard for free copy

Hydraulic Drill Units

Catalog AD 723 contains engineering data on a line of hydraulic drill units. The units have a spindle travel of 1% in. for the smallest unit and up to six in. for the largest. Delta Power Tool Div., Rockwell Mfg. Co.

Circle L-12 on posteard for free copy

USE THIS POSTCARD

Trolley Conveyor

Described in the February, 1953 issue of "The Messenger" is the Loadstar trolley conveyor. Mathews Conveyer Co. Booth No. 733

Circle L-12 on postcard for free copy

Lift Trucks

Now available in a bulletin describing Models 1000 and 1000-E lift trucks. Century Products Co. Booth No. 1822

Circle L-14 on postoard for free caps

Chains and Sprockets

Bulletin No. 52-1 describes a line of roller chains and sprockets. Featured is a section on the selection of standard roller chain drives. Baldwin-Duckworth Div., Chain Belt Co. Booth No. 1812

Circle L-15 on postcard for free copy

Trolley Conveyor

Recently released is a circular describing the Chainveyor continuouspowered, light-capacity, overhead trolley conveyor. U. S. Spring & Bumper Co. Booth No. 488

Circle L-16 on postcard for free capy

Truck Casters

Now available are a number of descriptive sheets on a wide range of truck casters. Complete specifications are given. Faultless Caster Corp. Booth No. 228

Circle L-17 on postcard for free copy

Conveyors

Bulletin No. 68 describes and illustrates a number of conveyor installations in foundries, steel mills, machine shops, and aircraft plants. Standard Conveyor Co. Booth No. 1530

Circle L-18 on postcard for free copy

Strapping and Tools

Ready is a brochure on strapping and tools, reel stands, and seals. H. G. Hanline Co. Booth No. 412

Circle L-19 on peetcard for free copy

Tapping Attachments

Now available is a brochure on Tapmatic attachments for non-reversible and Tapmaster units for reversible spindle machines. Tapmatic Corp.

Circle L-20 on postcard for free copy

Electric Tools

Form No. 10 covers a complete line of portable electric tools for a variety of jobs. Black & Decker Mfg. Co.

Circle L-21 on postcard for free copy

Pickling Acid Inhibitor

Recently released is a revised folder on Rodine pickling acid inhibitor. American Chemical Paint Co.

Circle L-32 on pesteard for free copy (See preceding page)

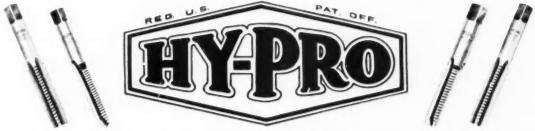
HY-PRO ENGINEERS ARE TAP SPECIALISTS!

...to help cut <u>your</u> tapping costs

Hy-Pro concentrates its operation on the production of taps. This allows its engineers and design specialists to continually aim their research and creative work at perfecting this one important line. Their established reputation of successfully meeting tap needs in all phases of production has been the result.

Whatever problem you may have in your own tapping operation—from a special job to one in your regular set-up—it will pay you to call your Hy-Pro specialists.

Get in touch with your local Hy-Pro distributor or our main office today for the full facts. Hy-Pro's full line of quality taps and its engineer specialists can help cut your tap costs.



HY-PRO TOOL CO., NEW BEDFORD, MASS., U. S. A.

ADDITIONAL WAREHOUSES:

6046 College Ave. OAKLAND 18, CALIF. Piedmont 5-4337 10428 W. McNichols Rd. DETROIT 21, MICH. University 4-1077 6141 North Elston Ave. CHICAGO, ILL. Newcastle 1-6486



FOR ADDITIONAL INFORMATION, please use postage-free reply card on PAGE 73

Pioneer relay.

High-Voltage Relay

Now available is a high-voltage, high-vacuum PS-32 relay with an externally operated d-c solenoid. It is 41/4 in. high with a 300-amp peak pulse current rating, a pulse duration of three micro-sec, and a vibration characteristic of 15 g's acceleration.

The unit is designed primarily for partial oil immersion applications for switching pulse-forming networks in radar installations. The lower portion can be sealed into the network case, transformer, or other oil-filled device. Pioneer Electronics Corp.

Circle P-1 on page 73 for more data



Pressure Controller

Recently announced is a cabin pressure controller weighing less than three lb. It combines a cabin pressure selector, rate of change selector, and a differential pressure control into one unit mounted on the pilot's instrument panel.

It is claimed that cabin altitude between sea level and 10,000 ft and any rate of change for cabin pressure between 100 and 2000 ft per minute may be very conveniently selected. AiResearch Manufacturing Co.

Circle P-3 on page 73 for more data

Universal Turbojet Engine Simulator

Recently announced is a universal turbojet engine simulator for developing, testing and calibrating fuel control components for gas turbine engines. It is claimed that the cost of final calibration of fuel controls on an engine can be reduced to about two per cent of their present cost by use of the unit.

The device is composed basically of a power source and an infinitely variable speed 100-hp hydraulic transmission for driving the fuel control, and engine simulator for representing the dynamic characteristics of turbojet engines, and the necessary

equipment for operating the fuel control under closely regulated calibrating conditions representing the actual situation the control may encounter in actual flight.

A single engine simulator is said to be readily adaptable to testing fuel systems for all current gas turbine engines including: turboprop engines; turbojet engines with fixed area tail; turbojet engines with afterburner; turbojet engines with variable area tail; and turbojet engines with variable area tail and afterburner. Vickers, Inc.

Circle P-2 on page 73 for more data



Electroflow blower.

Miniature Blowers

Recently announced is a series of miniature blowers for cooling industrial and airborne electronic equipment. The blower consists of a scroll which directs the flow of air produced by the enclosed blower wheel, and a suitable back plate.

The units are available now in four sizes. Molded from an Alkyd plastic material reinforced with fibre glass, the scrolls have high-impact strength and good dimensional stability.

Blower wheels are Sirocco type, aluminum or cadmium-plated, with hubs furnished in any standard bore. Blowers are driven by miniature 400-c or variable-frequency electric motors. Electroflow Pumps, Inc.

Circle P-4 on page 73 for more data



Vickers turbojet engine simulator.

Corrosion resistance eat resistance

MAJOR ENGINE
BUILDERS
Use
Scaled Theore
chrome rings



ore mileage

Lasy starting

Sealed Power KromeX

FULL-FLOW RING SETS

- 1 Top compression ring is chrome-alloy cast iron with SOLID CHROME face, factory-lapped to a light-tight finish.
- 2 Side rails of MD-50 oil ring have SOLID CHROME faces, Granosealed sides for flexibility. Hundreds of thousands of cars have proved this ring best for oil control even in badly tapered and out-of-round bores.
- 3 All rings are beveled or tapered to threadline contact for quick seating and blow-by control.

Sealed Power Piston Rings

SEALED POWER CORPORATION . MUSKEGON, MICHIGAN

Sole manufacturers of KromeX Ring Sets, MD-50 Steel Oil Ring, Full-Flow Spring, Flex-S Flexible Oil Ring, and GI-60 Groove Inserts.

Leading Producer of Automatic Transmission Rings, Power Steering Rings and Non-Spin Oil Rings.

The BUSINESS PULSE

Personal Consumption Expenditures, Outlay for New Construction, and Investment in Producers' Durable Equipment Registered Gains During the First Quarter of 1953 Above the Levels of the Preceding Quarter.

This Survey Is Prepared Exclusively for Automotive Industries by the Guaranty Trust Company of New York.

Effects of Peace Offensive

Uncertainty as to the possible effects of the latest Communist "peace offensive" on business in the United States has brought forth a series of statements by the President and some members of his Cabinet. These indicate that the recent overtures from Moscow and Peiping are not deemed likely to have any great effect upon our own defense program. The official view is that at present it is impossible to determine whether the apparent change of attitude on the part of the U. S. S. R. and its satellites really reflects a basic alteration of policy or merely a tactical maneuver to induce the West to lower its guard. As long as this uncertainty continues, officials hold, the only prudent course will be to assume that the latest Communist moves are merely a new tactic, and to proceed with rearmament according to schedule.

These statements of policy have not entirely removed doubts concerning the effects of recent international developments on domestic conditions. Some nervousness has been apparent in security and commodity markets, especially markets for the so-called international commodities. This weakness apparently reflects the feeling that, even in the absence of any major change in the defense program itself, a trend toward genuine peace might alter the psychology of consumers and business men sufficiently to affect demand in an important way, although so far there is no definite sign of such a tendency. The feeling also probably exists that, even though the pace of rearmament is not altered now, the ultimate effect of an improvement in international relations might well be to cause military spending to decline sooner and more sharply than would otherwise be the case.

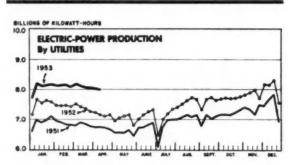
In short, the "peace offensive" has introduced a new

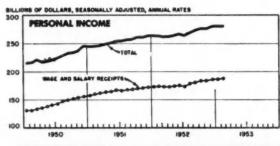
element of uncertainty into the business outlook, and uncertainty is almost always a cause of hesitancy in business dealings.

The level of business activity seems to have been affected little, if at all, by these developments, and current comment reflects the almost unanimous expectation that no essential change in volume of output or consumption is in immediate prospect. Industrial production rose to a new postwar peak in March, and preliminary estimates indicate that this level was approximately maintained in April. Nonagricultural employment is estimated at a figure two million above that of a year ago, with further increases anticipated as the season advances.

Except for temporary difficulties caused by a labor-(Turn to page 133, please)

Selected Business Indicators





Source; U. S. Dept. of Commerce

Raw material storage room where ingots are held for laboratory analysis. Temperature is controlled to prevent moisture pick-up.



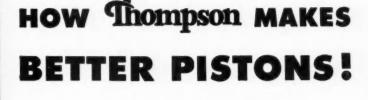
Electrically operated melting furnace in the Thompson foundry being tapped. Molten metal is held in gas fired holding furnaces at the casting operations.



A modern high-pressure, cold chamber die casting machine in operation at Thompson Products' Light Metals Division foundry.



A dependable uniformity of Thompson cast pistons keeps scrap losses at a minimum and assures closer tolerances in this Thompson finishing department.





Heavy-Duty Diesel Piston



......



Tractor Piston

THOMPSON research, engineering, foundry operations, machining and finishing didn't just happen. There's over 50 years of experience in precision manufacture of automotive and aircraft parts back of every Thompson piston.

From carefully selected raw materials, laboratory analyzed and controlled through melting and holding furnaces, cast in the most modern permanent mold casting machines and finished by expert machine operators—you get durable pistons.

Yes, Thompson makes dependable pistons—for airplane and passenger car engines as well as for heavy duty truck and tractor engines, both gasoline and diesel. We suggest you tell us your piston problems—we will be pleased to help you solve them.

You can count on

Thompson Products

LIGHT METALS DIVISION

2269 Ashland Road

Cleveland 3, Ohio



Write on your company letterbead for a copy of this data book on Thompson's Steel-Belted Pistons.



All-purpose Steel-Belted Piston

AIRBRIEFS

By ROBERT McLARREN

Smith Embraces Turboprop

A mild bombshell was thrown into the jet transport conflagration last month when C. R. Smith, president of American Airlines, came out full force for the turboprop transport as the answer to his future equipment needs. Smith, whose entire engineering department including famed William E. Littlewood, engineering vice-president, worked on the problem, believes that simple economics prohibits use of the turbojet transport for a decade. The turboprop, however, should provide speeds of 450-500 mph with economy, be well adapted to traffic control and "perform well on the ground." His studies indicate that a turbojet transport would save only one hour on a transcontinental flight over the turboprop and he believes the basic question is how much passengers would be willing to pay for that one hour. More than a year ago American Airlines released studies showing that the cost of changing present equipment from piston to turboprop engines was prohibitive so that it appears that American, at least, will be in the market for brand new turboprop transport equipment within two to three years.

Second Sources Out

Although widely rumored for the past two months, Deputy Defense Secretary Roger M. Kyes has given first official confirmation that the new Administration will either kill or greatly reduce the "second source" procurement philosophy of the Truman Administration. Under this program, all major military weapons (including aircraft) were built by at least two major producers—usually the parent firm plus one competitor. According to Kyes: "The general policy will be that of retaining the low-cost producer." In one of the most forthright statements by an Administration spokesman, Kyes says flatly: "... the Defense Department ... has only a handful of men whose abilities, knowledge and experience approach requirements of such a task."

Coronation Film Race

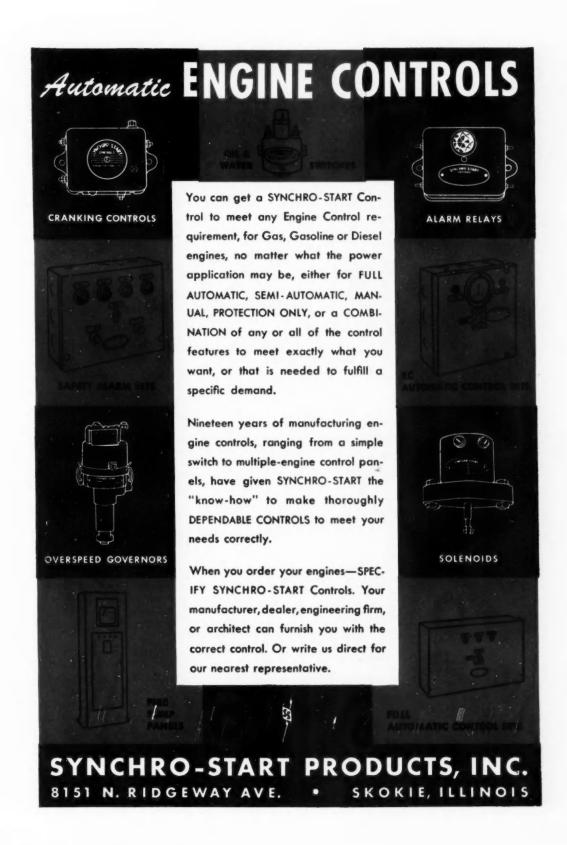
The delivery of Coronation films to U. S. television networks has quickly become a jet speed race. It all started innocently enough when CBS chartered a British Overseas Airways Boeing Stratocruiser as a "flying darkroom" to process the films whils flying across the Atlantic to New York. NBC countered by chartering a Lockheed Constellation for the same purpose. The Canadian Broadcasting Corp. then made arrangements with the British Air Ministry to have its films flown across the Atlantic by record-holding English Electric Canberra jet bombers of the Royal Air Force. CBS then discovered that Canberra bombers are due for delivery to the Venezuelan Air Force via the U.S. but its negotiations bogged down when it was learned that there were no Venezuelan Canberra pilots yet fully trained for the flight. CBS is now understood to have complete arrangements with the U.S. Navy to have the films flown across the Atlantic in a Navy jet fighter which would make two stops on strategicallyplaced aircraft carriers. The Navy believes the flight would be good "navigational training" due to the precision needed in locating the carriers on the speed dash. The average TV-viewer, meanwhile, can't understand what all the fuss is about over an event that occurs only about once every quarter-century-leaving plenty of time for seeing films of the event.

Airlines Smash Records

Final tabulations for 1952 show that U.S. scheduled airlines had the biggest year in their history. Total income for the year was \$1,120,000,000—the first billion-dollar year for the industry. This mighty intake resulted in record-breaking profits for the big airlines, including a resounding \$12.5 million for American Airlines, \$10.7 million for United and \$8.5 million for Eastern. While still subject to final mail payment, TWA showed an estimated profit of \$8.5 million. The airlines went into 1953 with the promise of flying more than a billion passenger-miles per month during the year. These profits, however, were darkened by rapidly-mounting costs which reduced the profit percentage. This percentage is falling due to the introduction of high-capacity new transports which are more difficult to keep filled and, therefore, have reduced the operating load factors. It is predicted, however, that this is temporary and the rapidly-mounting business in air coach should bring load factors up to new highs during the year.

During 1952 U. S. airlines carried more passengers more miles than any other form of public transporta-

(Turn to page 214, please)





Rear crankshaft section of Pratt & Whitney Aircraft R-2800 Double Wasp engine being masked with "Scotch" brand lead foll tope prior to chromiumplating operation.

Propeller shaft for Pratt & Whitney Aircraft R-2000 Twin Wasp engine being masked with lead foil tape prior to chromium-plating operation.



PROPERTIES OF THE TAPE

The tape is "Scotch" brand Lead Foil tape No. 420, made by Minnesota Mining and Manufacturing Co., St. Paul, which describes it as consisting of a composite lead alloy containing 95.5 per cent lead, 4.0 per cent antimony, and 0.5 per cent tin. Its exceptionally aggressive pressuresensitive adhesive is protected while on the roll with a red cellophane liner.

Total thickness (i	n.)					 	v	 0.008
Tensile (lb/in. of								
Stretch at break								
Adhesion to steel	(oz/in.	wid	th))	 	 		 40

Lead-Backed Masking Tape

Solves Special Plating Problems

By Walter J. Dyber

Foreman, Plating Department, Airport Overhaul Shop
Pratt & Whitney Aircraft Div. of United Aircraft Corp., East Hartford, Conn.

A NUMBER of difficult plating problems have been successfully overcome at Pratt & Whitney Aircraft by the use of lead-backed masking tape with a pressure-sensitive adhesive. The tape has been found particularly useful in hard chromium plating because of its ease of application, its tight seal, and its effective "thieving" action.

Following Pratt & Whitney Aircraft's successful demonstration of these advantages, other platers doing chromium work have been quick to adopt the use of such tape, while it has also been used effectively and to advantage by P&WA in plating nickel, tin, copper, cadmium, silver and lead.

For hard chromium plating, many firms have been using aluminum or lead foil of various thicknesses for masking, because of its effective thieving action—a process, including tooling, by which high current densities at sharp corners are prohibited from causing the deposition of greater amounts of plate than required.

When carefully controlled, thieving prevents excessive build-up of the chromium deposit and produces a bevel edge on the deposit along the line of demarcation. This is very desirable, since it eliminates a good deal of hand operations to remove the build-up prior to its final machining.

Aluminum and lead-foil masking, however, did not always give the tight seal desired of a masking material.

(Turn to page 106, please)

What Does it Take To Be the Industry Standard?

Whether the press is a medium tonnage machine like the one shown here, or a 3,000 ton F-type model used to produce automobile tops, each has the common denominator of Clearing engineering. This means that the press has an all-steel welded frame, precision machined gearing and smooth power transmission—features that make for dependable service year in—year out.

Time and performance have been the judge and jury of these presses. Hundreds of installations have proved their reliability under all kinds of working conditions. That's why, in stamping plants from coast to coast, Clearing F-type presses are recognized as the industry standard.

Clearing single action F-type presses are available in capacities up to 5,000 tons. If you need a single press or an entire line, you'll find the right equipment for your requirements at Clearing Machine Corporation.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION, 6498 West 65th St., Chicago 38, Illinois • HAMILTON DIVISION, Hamilton, Ohio

NEEDED—an Evaluation of Fork Lift Trucks

Selection and application of materials handling trucks is "very slipshod" in industry today, David C. Prosser, senior methods and standards engineer, Minnesota Mining and Manufacturing Co., St. Paul, Minn., told executives attending the American Management Association's na-

tional packaging conference last month at Navy Pier in Chicago.

If the maximum potent al of these machines is ever to be realized, he said, the tools of scientific management that apply to them must be discovered and provided. For example, by installing material handling trucks

and palletization Minnesota Mining was able to effect immediate economies, but investigation showed that better use of the equipment could save an additional \$100,000 a year.

To develop a measurement tool, company engineers broke the fork truck operation down into six basic elements. Each element was measured individually and under controlled conditions, and a time value based on the measurement was assigned to each. After determining what safety and productivity rules and regulations applied to a given operation, the engineers determined how the operation was to be performed and then described the operation in terms of the six basic elements.

This description, showing the sequence of the elements, was set down in a "standard work procedure." The time required to perform the operation was determined by adding the standard time values for the various work elements required, with allowance for rest and delay. Each model and type of truck used in material handling was measured in this way, and the resulting information was put into a form that was catalogued for easy reference.

This measurement tool has a number of applications, Mr. Prosser reported. It gives the manager of material handling operations a sound basis for controlling his costs. For example, measurement of material handling in a new warehouse indicated the trucks in the area were being utilized only 45 per cent of the time. By increasing utilization from 45 per cent to 90 per cent, \$30,000 a year could be saved.

"I do not point out this example because I think it is unusual," Mr. Prosser declared. "I point it out because I think it is typical of the warehousing and material handling truck operations as they exist today in industry."

This type of information, catalogued and put into a simplified form, could help the salesman discuss with his customers the productivity of the truck he is selling, according to Mr. Prosser. It could help him justify the expenditure the customer would have to make for a truck and thus expand the field of use of material handling trucks. A salesman also could use it in helping his customers gain maximum utilization of the trucks they have in operation.

This tool also would offer the manufacturer of material handling trucks a basis of comparison between his truck and his competitors'. It would give him direction for future design



Successful operation in many thousand motor-driven products and devices—over a period of 36 years—has proved the thorough reliability of Lamb Electric Motors.

The good service for which Lamb Electric Motors are known, rejults largely from the fact that they are designed to provide the exact electrical and mechanical requirements for each product they drive.

This special engineering assures top product performance and usually results in savings in space, weight and cost factor. The Lamb Electric Company, Kent, Ohio.

THEY'RE GOING INTO AMERICA'S FINEST PRODUCTS



Motor having substantial power

output for computing machines

and other types of motor-driven

office equipment,

Planetary inbuilt speed reducer permits a straight-line drive, symmetrical construction; insures good performance.



NEW

MUSKEGON

"UNITIZED"

OIL CONTROL PISTON RINGS

pre-assembled...install like a one-piece ring!

Dangle a new, patented Muskegon "UNITIZED" steel oil control piston ring from your fingertip and see a world of difference! For this multiple piece ring not only has superior features but it handles like a one-piece ring! That's right! This exclusive Muskegon ring is pre-assembled . . . and BONDED TOGETHER—holds fast until the engine is run.

This Muskegon "UNITIZED" piston ring eliminates assembly time and assures the *right* assembly. It can be inserted and compressed like a one-piece ring. It's fast and simple to install.

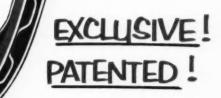
Here's more good news! The Muskegon "UNITIZED" ring is available in these two types: CSR-200 with fully chrome plated edges for double to triple ring life; and the CSR-100 without chrome edges. These rings will meet all your requirements and they are "Muskegon engineered" for dependable performance. Call or contact us now!

MUSKEGON PISTON RING Co., Muskegon, Mich.



HANDLE LIKE A ONE-PIECE RING!

Rails and spacer are correctly assembled . . . and bonded together making it as easy and convenient to handle as a one-piece ring whether on the production line or in the service shop.





Muskegon CSR-200 "UNITIZED" ring consists of: spacer, two rails—with edges fully chrome plated assuring double to triple ring life and heavy duty expander.



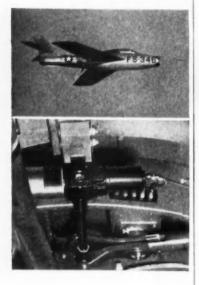
BONDING AGENT DISAPPEARS DURING ENGINE RUNI

Muskegon bonds the pieces together with a special adhesive agent that dissolves in the hot engine oil during engine run. Pieces free entirely to give the outstanding, long performance for which all Muskegon rings are noted.

Piston Rings

DEYROIY OFFICES
521 New Center Bidg.
Telephone Trivity 2-2113

Rudder Trim System on Republic's F84F Airborne actuated



The R-244-M14 LINEATOR® Electric Linear Actuator is specified equipment on Republic's new sweptwing F84F Thunderstreak. This actuator features radio noise filter. neutral light switch, positive mechanical stops, and externally adjustable position limit switches.

For complete information about LINEATORs and other Airborne electromechanical actuators, see our literature in the Institute of the Aeronautical Sciences 1953 Engineering Catalog.



of his trucks that would permit him to design a truck more compatible with the user's needs.

"If we can provide the data from a measurement of this type for all the various types and models of trucks in a catalogue form," Mr. Prosser concluded, "we will have truly provided a basic tool of scientific management for the field of material handling trucks and in turn will realize some tremendous cost reductions in applying and using powerful material handling trucks."

BOOKS ...

MANUAL ON CUTTING OF METALS, published by The American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y. Price, \$10.00. Written in collaboration with 22 specialists. this new second edition enlarges upon the first (published in 1939) in that It incorporates a more descriptive presentation of tool materials and their treatment; of work materials and the relations of their behavior and properties to microscopic structure; and much new material on the types, purposes, and application of cutting Additionally, there are extensive new tables giving both unit-horsepower and machinability ratings for a great number of steels of various hardnesses for specific tools and cuts; and charts for determining speeds for several combinations of cut, tool shape and material hard-nesses. Specifications for many of the materials covered in the new tables are for the most recent revisions of mechanical properties. The tabular data on cutting speeds and horsepower of the first edition are retained because of their comprehensiveness

Automation **Problems** analyzed at MACHINE TOOL FORUM

(Continued from page 48)

shaft lathes with automatic loaders do make it possible to maintain a high rate of production at all times. However, the present machines with automatic loaders are really semiautomatic in operation because they require an operator to perform certain functions. Therefore, the production rate is still limited by the will of the operator. Improvements are now under way to increase production further by making these machines fully automatic.

Due to the construction of these



Illustration shows cab doors for Autocar trucks being cleaned, phosphate coated, and dried.

This METALWASH phosphate coating machine provides an ideal surface for a lasting paint finish on truck chassis and sheet metal parts.

Cleaning and phosphating are uniform since the cycle is automatically controlled. Continuous operation, built around the conveyor line, eliminates material handling problems.

Metalwash Finishing Engineer, published quarterly, is available on request to engineers and executives to whom cleaning and finishing are operations of interest.

Write on your company letterhead for your free copy.



924 North Ave., Elizabeth 4, N. J. Representatives in principal cities

more dependable starting under all operating conditions

"No Kick-Out" feature sets new standards in starting performance.

Since the earliest days of the automotive industry Bendix* Starter Drives have been noted for reliable starting.

Now with the new and latest Bendix Folo-Thru Starter Drive, starting, even under the most adverse weather conditions, has been improved immeasurably.

Although this new Bendix Starter Drive is fundamentally similar to its illustrious predecessors, it is specially designed to follow through the weak explosions until the engine actually runs on its own power.

That's why cars, trucks and buses equipped with the Bendix Folo-Thru Drive are easier and quicker to start under all operating conditions.

ECLIPSE MACHINE DIVISON OF



ELMIRA, NEW YORK

Bendix

folo-thru

starter drive

COSTS LESS - The new Folo-Thru Drive requires no actuating linkage and the less expensive solenoid may be placed in any convenient position. Results are lower installation costs and no adjustments. Complete detailed information is available on request.



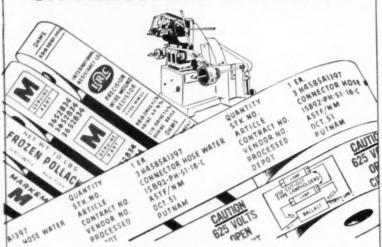
Bendix * Fele-Thru Storter Drive Bendix * Automotive Electric Fuel Pump





MARKE SOLVED THIS MARKING PROBLEM

PRINTING LABELS ON PRESSURE SENSITIVE TAPE



The introduction of pressure sensitive tape for industrial uses offered many advantages if label data could be printed on the tape in the plant itself when needed. Markem developed methods that permit printing of stock number, part number, trade mark or other designation on this tape. Label inventory problems are thus eliminated. Manufacturers can now print the exact number of labels required . . . readily changing variable information or color of ink when desired. The Markem method used includes a Markem machine which makes up to 85 imprints per minute, rewinds the roll of tape automatically, and shuts itself off after a selected number of imprints. Thus Markem has provided industries of all types with a more modern, more attractive and less expensive means of labeling.



CAN MARKEM
Printing labels on pressure sensitive tape is but an example of how Markem solves industry's marking problems. Markem has been providing industry with production techniques and equipment

to identify, decorate or designate its products, parts and packages since 1911. Markem also provides technically trained men who are available in your area to assure continued satisfaction with Markem methods and equipment.

When you have a marking problem, tell us about it and send a sample of the item to be marked. Perhaps a complete Markem method has already been developed to solve your problem. If not, Markem will work out a practical solution.

Markem Machine Company, Keene 8, N. H., U. S. A.



machines the automatic loaders must follow a definite curved path, changing directions in both the horizontal and vertical planes for loading. Another curved path is followed for unloading. This is accomplished by using mechanical motion, hydraulic power and electric control.

Figure 1 is a side view of the 6 AC pin lathe that shows the two sets of hooks on each arm that are used to unload and load two cranks at one operation. The 6 AC automatic loader sequence of operation for rough crankshafts on the right is as follows:

After turning two crankshafts, the machine automatically stops in the loading position. This is accurately located by a first cam position switch that plugs the motor to give automatic jogging at slow speed into the loading position. At this point, a second cam position switch disconnects power from the motor and plugs it to the final stop.

The operator opens the door, releases the steady rests and unchucks the crankshafts. He then presses the load push button to start the auto-

The loader starts from the central rest position and traverses to the right hand end to stop against a bumper block where it contacts a limit switch. This energizes a solenoid valve and causes the elevating cylinder to lower the elevators with the hooks down.

At the end of the elevator down stroke, limit switches energize a solenoid valve that makes the left hand hooks pick up the two finished crankshafts, the right hand hooks and the two rough crankshafts.

At the top of the hooks' up-stroke, limit switches energize a solenoid valve to cause the elevators to rise.

When the elevators return to the up position, limit switches energize a solenoid valve to cause the loader to travel to the left hand end to stop and contact a limit switch. This energizes a solenoid valve to lower the elevators.

At the bottom of the elevator down stroke, limit switches now operate to energize a solenoid valve to lower the hooks. The left hand hooks deposit the two turned crankshafts onto the left hand rack or onto a conveyor, and the right hand hooks deposit the two rough crankshafts into chucks in the

At the bottom of the hooks' down stroke, limit switches energize a solenoid valve to cause the elevators to return to the up position.

When the elevators reach the up

Power for Power-Steering



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For your new models—advanced low-cost design, reduced horsepower requirement, new systems.

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General Offices: CLEVELAND, OHIO

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9771 French Road . Detroit 13, Michigan

position, limit switches energize a solenoid valve that causes the loader to traverse to the right where it is stopped in the central rest position by a limit switch. This completes the loader automatic cycle.

Electrical interlocking is provided to insure that the loader is in the center position and is inoperative while the crankshafts are being machined. Also the machine is inoperative while the loader is in operation.

When the loader is operating, it can be stopped in any position by pushing the stop loader button. This deenergizes the main valve only and blocks everything else as is.

A manual-automatic selector switch provides means for selecting either manual or automatic operation of the loader, and when set for manual, each movement of the loader can be operated by push buttons.

Changes in Machine Tool Design to Facilitate Automation Design

By R. Juengel Ford Motor Co.

THIS paper is intended to present suggestions which would eliminate some of the problems en-

countered by Ford Motor Co. when adapting machine tools to automation.

To date, practically all in-line transfer type machine tools built have been designed for manual loading and unloading. An operator pulls the part from the unload station of one machine, slides it over a gravity roll conveyor for an indefinite distance, and pushes it onto the load station of the next machine. In all cases, he also has manual push buttons which initiate the indexing cycle. Practically all the in-line machines which have been ordered for the new Ford block and head lines have been of this type.

With the decision to fully automate the head and block lines, the Ford automation designer has had to convert machines which were originally designed for manual, to automatic operation. This conversion is sometimes difficult.

With the advance knowledge that machines will be served by automation, machine tool manufacturers could alter their designs to facilitate the designing and installation of automatic loading and unloading devices.

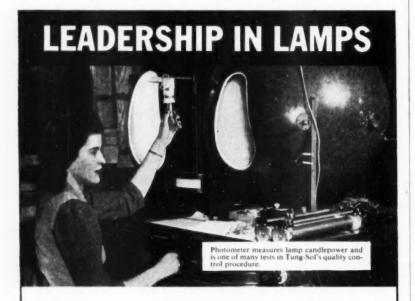
Here are a few suggestions for alterations:

All machines, when possible, should be designed as in-line "thru" machines. It is almost impractical to design automation for the "in-andout" type of machine, and is impossible as far as high production is concerned. The part should never have to unload by reversing the path thru which it loaded.

It would facilitate the application of automation to always have the load and unload stations removable, and in many cases left off entirely. This condition is especially desirable in cases when available room is at a minimum and the removal of these stations would allow necessary space for automation.

The purpose of this type of automation is to receive parts from one transfer machine, index them to the next operation, and automatically start the machine cycle when the part is located in the load station.

(Turn to page 95, please)



Tung-Sol has specialized in the design and manufacture of miniature lamps ever since electricity replaced oil for automotive lighting. Tung-Sol was first with Tulite, a double filament lamp and first with the fixed focus headlamp.

Today Tung-Sol offers the industry a complete line of lamps in the 6-8 and 12-16 volt ranges, with a special series of truck lamps made extra-tough for extra-tough service. Tung-Sol production facilities are capable of high volume output to meet critical manufacturing schedules without sacrifice of Tung-Sol quality, which is second to none.

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Presented as a service to machine shops, we hope some of these interesting ideas, culled from thousands of jobs, will suggest ways to help you cut time and costs in your own metal work.

NOW, FOUR TIMES THE SURFACE LIFE FOR THESE MILL ROLLS Yet SUPERFINISH Achieves It In Half the Time

Where you have parts requiring the finest possible surface smoothness, Superfinish saves time and gives you better, longer wearing surfaces. You can bank on it!

Here, Superfinish is at work in the steel industry-finishing mill rolls used for producing stainless steel strip. The machine, a Model 78 Mill Roll Superfinisher handles a variety of these rolls in a fully automatic cycle.

Here's how it saves:

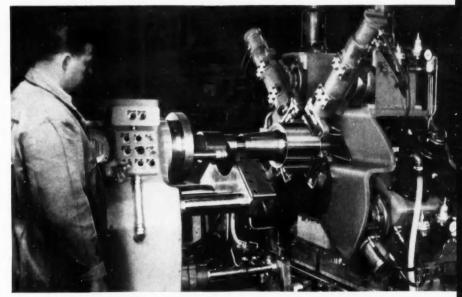
Finishing-Rolls are brought down from 15-20 to 1-2 micro inches RMS by Superfinishing. A roll 36 inches long by 20 inches in diameter requires just 15 minutes to finish . . . less than half the time for grinding.

Longer Life-The Superfinished surface is base metal, not the soft, annealed "smear metal" produced by grinding heat. Experience has proved that this harder, better wearing surface gives the rolls more than four times the service life of those finished by the old method.

Reduced Buffing-The Superfinished rolls leave a much finer surface and the stainless strip requires far less buffing to obtain the desired reflective surface.



Quick-change stoneholder, with two Superfinishing stones, as used on each of four heads.



Superfinisher has fully automatic cycle. After loading, operator merely presses a button; the spindle then drives the roll, and the finishing heads move up to the work and begin oscillating.

These basic advantages of Superfinish-better, longer lasting surfaces that cost less-can be applied to your problems involving cylindrical surfaces. Ask for the reprint, "Mill Roll Superfinisher," which tells the complete story. We will also be glad to send you a free copy of the most authoritative textbook on this modern process, entitled, "Wear and Surface Finish.'

Superfinishing gives these mill rolls smoother, longer lasting surfaces, and produces them in less than half the time required by grinding.



Roll surfaces finished to a smoothness of 1-2 micro inches RMS.



TIME-SAVING IDEAS

IDEAS LIKE THIS CAN INCREASE YOUR PRODUCTION

Many Surfaces Handled by Ram Type Lathe in One Chucking

faces
faces
faces
d by
Lathe

Careful planning shows up on these
first operations for a steam trap head.
A Gisholt No. 3 Ram Type Turret
Lathe was selected for it because of
the many surfaces that can be handled in one chucking.

For fast handling, an air-operated

For fast handling, an air-operated chuck is used. These are the operations: drill D, face F, drill B and C, bottom drill D to stop, and tap D while finish facing F. Time is less than 2.5 minutes, floor-to-floor.

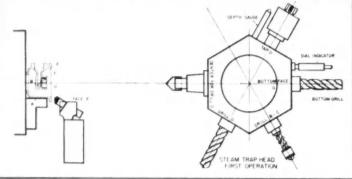
To insure concentricity for B and C, the drill is supported with a bushing in D. Note the indicator to hold the depth of the bottom drill for D. This keeps the depth in perfect relation to face F. Interesting, also, is the depth gauge for D, which assures accurate tapping to the bottom of the hole.

When you plan your setup carefully like this around a fast machine like the No. 3 Ram Type Lathe, you're bound to get low-cost, high production every time.

Here, use of air chuck and combination tooling increases speed, while the indicator and depth gauge insure maximum accuracy.



First drilling operation on steam trap while facing from square turret.



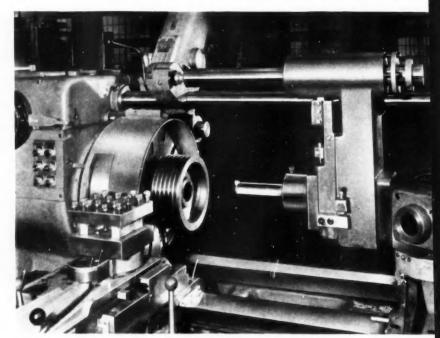
HERE'S HELP FOR SOME OF YOUR TRICKY BORING JOBS ...

Special Unit on Saddle Type Lathe Handles Reverse Tapers or Special Contours

Here's an idea that can make boring operations easier. It's a special taper boring unit, mounted on a 3L Saddle Type Turret Lathe. In this case, conventional taper boring, it makes use of a stub boring bar, a slide tool and a special overhead pilot bar with milled slot holding a cam plate.

It works this way: As the turret carriage feeds forward, a cam follower on the slide tool rides along the cam plate. This guides the tool slide and boring bar along the angle of the cam plate . . . continuing past the cut before stopping. As the turret is retracted, the boring tool is held away from the finished surface to provide tool relief on the return stroke. When the tool is clear, it is automatically recocked for the next piece.

With this special attachment, fast, accurate bores, tapers and contours can be made without tool marks.



Special taper boring unit on fixed center 3L Saddle Type Turret Lathe

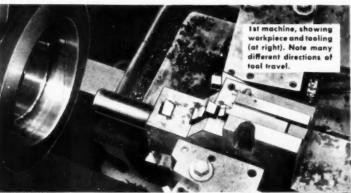


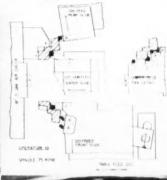
FAST TEAMWORK TO BEAT HIGH COSTS

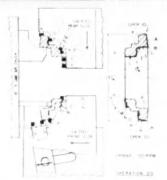
Two Simplimatics and One Man Finish Parts in Jig Time



TIME-SAVING IDEAS







2nd machine handles other side to complete job. Tool setup shown at left.

It's simple ideas like this that frequently pay the biggest dividends.

By pairing up two Simplimatic Automatic Lathes with one operator, these bevel drive gears are produced in quick "one-two" sequence.

The first operation takes 5.0 minutes floor-to-floor. Rough and finish cuts on both straight and angular surfaces are done by front and rear slides while five tools on the center slide handle three diameters and two radii at the same time.

Time is 2.5 minutes floor-to-floor for the second operation. The rear slide faces the end, gear flange, chamfers, and rough turns two shoulder diameters. The front slide, operating longitudinally, finish sizes the two shoulders, corner rounds the bore and carries a sliding tool with cam block for rough and finishing the taper O.D.

Easily tooled to combine both straight and angular work of all kinds—the Simplimatic provides fully automatic operation, enabling one man to tend both machines. It's another example of the adaptability of the standard Simplimatics. New catalog shows many examples. Ask for it.

"TURN-ABOUT" GETS RESULTS WITH AWKWARD PARTS

Chuck Holds Tools—The Slide Holds the Work in this Novel No. 12 Hydraulic Lathe Job

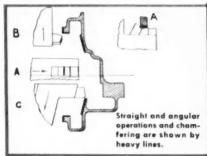
See how good headwork and the No. 12 Hydraulic Automatic Lathe are paying off on this gear case job:

To do the awkward, jumbo-size part the usual way on a conventional turret lathe would have dictated an excessively large machine operating at slow speeds.

However, by turning the job around...and ingeniously mounting the tools on a rotating head and the gear case on a special longitudinal slide, the work feeds to the tools. Boring tools, mounted in a stub bor-

ing bar, do rough and finish boring and chamfering (A). Forward motion of the work-holding slide then stops and tool (B) faces outside surface. At the same time, tool (C) does angular surface—completing job in a single, automatic operation. Floor-to-floor time is just 1.7 minutes.

No. 12 Hydraulic Lathe with rotating tools (instead of work) shows way to real savings in machining time and costs ...and in machine investment and floor space.









HOW TO TURN A HARD JOB INTO AN EASY ONE

Ten Critical Surfaces Machined by Fastermatic... Automatically

TIME-SAVING IDEAS

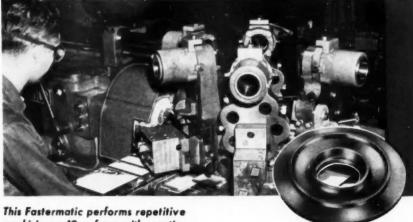
Here's the problem that faced this producer of 7" ball-bearing support rings for our jet program:

The material is difficult-alloy steel forgings of 40-41 Rockwell C. A large number of cuts are required -10 in all. And, close tolerances

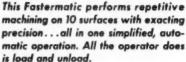
must be held.

The combination of a 2F Fastermatic Automatic Turret Lathe and excellent tooling did the trick-with the entire job handled in one chucking.

The drawings show how all six stations of the turret are used. Also, the front and rear independent cross slides. All roughing and finishing operations are completed in 4.5 minutes, floor-to-floor.



Fastermatic setup for machining support rings.



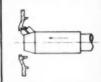














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The required correction on this 300 lb. rotor assembly is read directly from the meter on the Gisholt Type U DYNETRIC Balancer. With the amount and location of unbalance

determined, a length of solder corresponding to the amount indicated on the machine is metered out and added to the banding wires-while the part is still in the machine.

The results? Increased service life of rotors and armatures, less maintenance, more efficient operation. The Balancer also handles couplings, clutches, fans, etc.

Unbalance in a variety of parts is located, measured and corrected - all without removing parts from machine.

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Madison 10, Wisconsin

TURRET LATHES . AUTOMATIC LATHES . SUPERFINISHERS . BALANCERS . SPECIAL MACHINES

(Continued from page 90)

The load station of an in-line machine is invariably an area within the range of the machines indexing bar. It usually consists of a pair of rails, or a horizontal flat plate supported on the machine by a knee casting, a weldment, or a continuation of the machine base.

When automation is used to locate a block in this loading area, the last index station of the automation shuttle may become the loading area. In this case, it is necessary to remove any loading station provided on the machine to make room for the automation.

The same reasoning applies to the unload end of the machine. When a machine is to unload onto the automation unit it is sometimes necessary to remove the unload station of the machine.

Care should be taken in designing these machines, to avoid any obstructions before the load and after the unload ends which would interfere with the installation and operation of automation units.

Side rail guards should be flared out to provide easy entrance for the automated part.

Centerlines of the load and unload stations should be definitely located.

As automation is usually designed and fabricated previous to the actual setting of the machine, and if the automation fabrication is to fit perfectly between them at a later date, the accurate locating of two machines in line is of vital importance.

A definite finished boss, or a construction hole should be provided at both load and unload ends; these locations to have a definite stated relationship to the position of the part in the first and last index position, or to the index fingers in full forward position.

This policy of locating all assembly dimensions to a construction hole is also applied to design of automation shuttles. Thus, if a shuttle is located accurately to the construction hole (a measurable point) all other assembly dimensions will also be consistently accurate.

Machine tool manufacturers should attempt to hold their rough overall casting and weldment dimensions to print specifications. While the index stations are accurately located to each other, the entire machined dimension system may float in location in the overall rough casting or weldment. This may leave excess rough casting or weldment stock, which will enroach on the available space left between set machines for the automation unit.

Positive stops or locating stop

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fingers should be provided in the load area as a safety measure in case of limit switch failure. This would prevent the automation unit from trying to push parts into the first work station.

Machine designers should avoid mechanically trapping the part which is being unloaded. If the machine is shut down with the unloaded part trapped, it is not possible for the automation to cycle. An automation unit should be able to cycle when the preceding in-line machine is shut down.

Access to the machining index stations and tooling should be provided in the body of the machine. This will eliminate the necessity of removing an automation unit to gain access to the stations thru the end openings.

All mechanisms within an in-line machine should be designed to remain stationary after the stop button is pushed. If mechanisms are allowed to coast, or drift, a limit switch may be tripped initiating an automation cycle on the assumption that the machine cycle is complete.

Automation requires adequate machine prints which will show a complete plan and side view with related index station dimensions, and fairly detailed pictures of the load and unload stations. Electrical and hydraulic prints also are required to determine interlocking.

In order to automatically control an automated system, the hydraulic and pneumatic directional valves must be solenoid operated. The valves that affect automation operation are those which control machine elements operating in the load and unload areas. Each of these valves should be the double solenoid—four-way type.

In the case of the transfer bar, a spring centered valve is most desirable. When the emergency stop button is pressed during a loading stroke, the transfer bar must stop instantly. Upon restarting, the bar must remain at rest until manually operated push buttons are used.

Hydraulic valves for operation of transfer fingers or dogs and positive stops should be two position valves so that return of power will cause these elements to be held in the position which existed before shut-down.

With automation serving a series of in-line transfer machines it would be convenient for operating personnel, if all push button panels were located on the right hand side of the machine. This side of the machine being determined by facing in the direction of part movement.

Naturally, some of the suggestions presented here will probably not be applicable to every machine. Future



The Sense the Fable Makes:

You are often told that there are miracle-working cutting fluids that will cure all your problems in machining everything from brass to stainless. They often turn out to be like the phoney frog in the fable. Here is an example:

A Stuart Oil customer was using Stuart's SpeedKut B Cutting Oil on his Brown & Sharpe automatics for threading SAE 1020 material. He was induced to try a "do-everything" product on the job. Picture A shows what happened! Picture B shows the same job machined with Stuart's SpeedKut. The "frog oil" didn't have enough cutting value.

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Your Name

Title

THE GREAT MISTAKE OF KARL MARX

(Continued from page 37)

terprises, the workers now took their orders from the bureaucrats; and the very first thing that these bureaucrats tried to do was to show a profit on these state-owned operations. To that end they raised prices substantially and repeatedly; and they resisted wage increases with a determination and force that government alone can command.

To this day the pay of the British steelworker is only about one-third as much as is paid to the average worker in our American steel mills; and now a disillusioned England has turned its back on the Marxist philosophy and is trying hard to unscramble its Socialistic omelet.

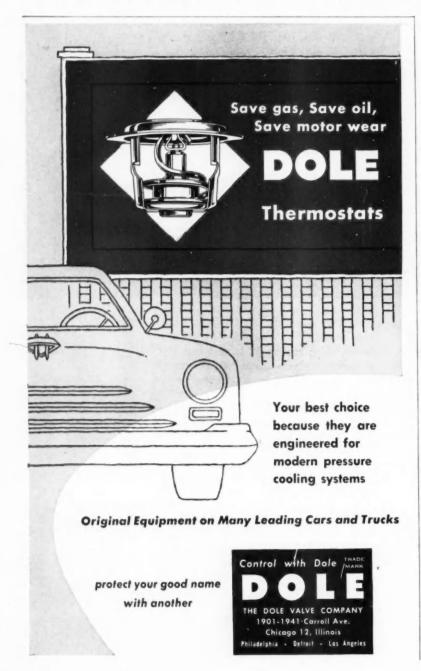
Marx, in his thirst for revolution, overlooked completely the only economic system on earth under which it is possible for the workers themselves to own, to control, and to manage directly the facilities of production. Shocking as the news may be to the disciples of Karl Marx, that system is Capitalism!

The truth is that here in America we have real and direct public ownership of our biggest and most important industries. That ownership is sold daily, in little pieces, on the stock market. It is constantly changing hands; and if the workers of this country truly wish to own the tools of production, they can do so very simply.

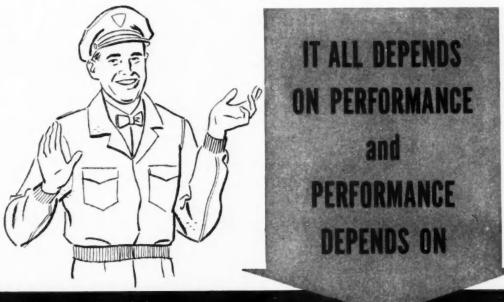
For example, at today's market prices, the employees of U. S. Steel could buy every share of the outstanding common stock of the corporation just as easily and just as cheaply as they can purchase a moderately good automobile. The approximately 300,000 employees together could buy all the common stock of the corporation by purchasing just 87 shares apiece. At today's prices, those 87 shares would cost them a total of less than \$3500. At today's wages the average steelworker earns that much in approximately 10 months.

By investing \$10 a week apiece, which is about what our steelworkers gained in the recent wage increase, the employes of U. S. Steel could buy all of the outstanding common stock in less than seven years; and except for the relatively small fixed sum that is paid in dividends on the preferred stock, our workers would then be entitled to receive all of those so-called "bloated profits" they have heard so much about. At current rates, however, the total dividend on their 87 shares would amount to only \$261 a year.

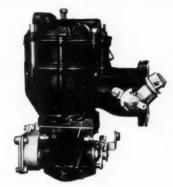
For every dollar paid in dividends, the company is paying about six dollars in taxes to the federal, state and local governments. Of the total sum which the workers and the owners of U. S. Steel divided up between them last year, more than 92 per cent went to the workers, while less than eight per cent went to the owners. Yet that small share which went to the owners was the total "rent" paid them for all



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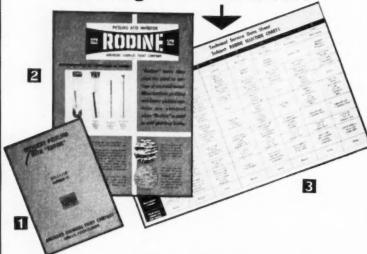
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plants and furnaces and facilities used in making steel. Without these facilities, of course, our men could not have made any steel at all.

of the billions of dollars worth of

Let the workers take one-tenth of everything the owners received for the use of these tools, and what would they get? Less than a dime a day. If the workers should grab all of the owners' share, wiping out all of these dividends completely and forever, they would destroy the company, destroy their jobs, and wipe out the savings which more than 275,000 of their fellow Americans have invested in our business. And for what? For the price of about three cartons of cigarettes a week, apiece.

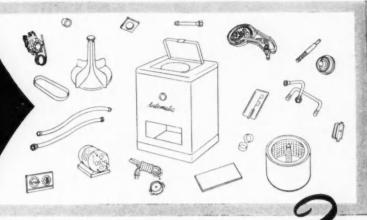
American workers will never improve their standard of living by grabbing the meager share which the owners get from our present economic pie. They will only do it by producing a larger pie with a bigger share for everyone. If we produce more goods we shall have more goods to divide among ourselves. If we produce fewer goods we shall have less to divide and less to live on. The interests of worker and owner are not antagonistic, but identical; that under our American system of enterprise, it is impossible for one to prosper while the other suffers. That is the lesson which, somehow, we must learn; yet we find people today-both in and out of the crackpot fraternity of Karl Marx-who are trying to keep us from learning it. In short, they follow the old political maxim: "Divide and Rule."

Sad to relate, that policy has serve them well on occasions, but it has aways served America ill. There is no future in it for us or for our people. But there is a future, a very great future, for every American in protecting and perfecting the only economic system in the world where men and women, in every walk of life, can and do own the tools of production.

French Mathis Exits

Declared bankrupt by the French courts, the E. E. C. Mathis automobile factory at Strasbourg has been definitely closed and the entire staff dismissed. The factory was damaged during the war and was never completely rebuilt, nor was automobile production resumed. For the last few years a reduced staff has been occupied on agricultural tractors and parts for other industries. Between the two wars Mathis figured among the big French automobile manufacturers. At one time he succeeded in linking up with Ford and produced the Matford.

You Wouldn't Buy a Washing Machine This Way



Then Why Buy Hydraulics Piecemeal

VICKERS Custom-Built HYDRAULIC POWER UNITS

You would never go to the trouble of buying automatic washing machine parts and assembling them yourself. It would take a lot of time and patience and trouble. For one thing the maker could not risk guaranteeing the finished job. You buy a washing machine as a unit, and want the undivided responsibility of the manufacturer.

Then why buy hydraulics piecemeal when there are so many advantages in a Vickers Custom Built Power Unit? It is built to meet your individual requirements, in a compact, neat, self-contained "package." It includes all necessary pumps, valves, intermediate piping, oil reservoir, motors, controls etc. as well as all hydraulic accessories (oil filters, air cleaners, oil level gauges, fittings etc.). Hydraulic connections are grouped in a convenient manifold.

Hydraulic design is simplified and improved, and you save substantially on installation and maintenance cost. Vickers takes undivided responsibility for the entire hydraulic system and you get the benefit of Vickers skill and experience. These advantages are important to both the machine builder and his customer.

Ask the nearest Vickers factory-trained application engineer to send you new Bulletin 52-45 or to make a personal call.

Improve and Simplify Hydraulic Design

Reduce Installation and Maintenance Costs

VICKERS Incorporated

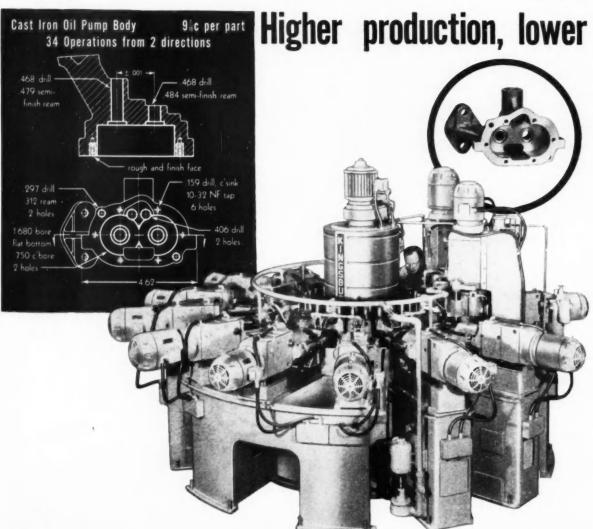
1428 OAKMAN BLVD. . DETROIT 32, MICH.

Application Engineering Offices:

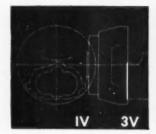
ATLANTA • CHICAGO (Metropolitan) • CINCINNATI • CLEVELAND DETROIT • HOUSTON • LOS ANGELES (Metropolitan) • NEW YORK (Metropolitan) • PHILADELPHIA (Metropolitan) • PITSBURGH ROCHESTER • ROCKFORD • SEATTLE TULSA

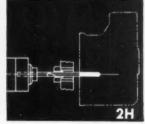
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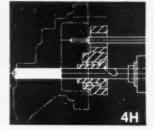
ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

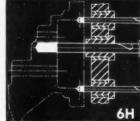


Follow this Cast Iron Oil Pump Body through a KINGSBURY









This Kingsbury accomplishes 34 operations from two directions. It mills, drills, bores, c'sinks, reams and taps. Used by a leading automotive manufacturer for a cast iron oil pump body, it produces 200 parts per hour gross; has a central column with an 84-inch base and a 60-inch index table with 14 stations. Of the 13 units, two are vertical (V) and 11 are horizontal (H). Eight of these units have multiple spindles.

Thirty-four operations are accomplished by one man on this one machine. Follow through and see:

Unit 1-V (Station 1 vertical) rough mills the base of the large flange. This milling operation employs our heaviest milling unit: about as large as we care to handle.

Unit 2-H with six-spindle head drills six .159 holes .74 deep.

Unit 3-V finish mills the face.

Unit 4-H countersinks three of the .159 holes and drills a .453 hole.

Unit 5-H countersinks the remaining three .159 holes and drills a .438 hole.

Unit 6-H drills a .406 hole and two .297 holes.

At *Unit 7-H* another .406 hole is drilled and the .297 holes are .312 reamed.

costs, soon pay for a Kingsbury

Combined operations on a Kingsbury bring you distinct advantages.

You benefit from the combined operations of a Kingsbury special purpose production machine. Output per man hour is increased. The part is not moved after once being chucked. It travels through a work cycle where units of from ½ to 5 hp each drill, ream, c'bore, mill, tap, thread, etc., accurately and automatically.

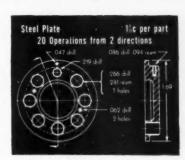
These combined operations cut production costs. Only one operator is required. He loads and unloads the machine. Handling of each part is reduced to this one chucking operation. There is almost no scrap loss — each part is machined uniformly to specifications. Less floor space is required than for separate machines.

If you are interested in further information on these special purpose machines, we'd be pleased to hear from you.

> Kingsbury Machine Tool Corp., 101 Laurel St., Keene, N. H.

KINGSBURY

AUTOMATIC DRILLING AND TAPPING MACHINES for Low-Cost High Production



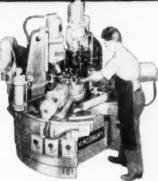


Steel Plate
540 parts per hour gross
1 6/10¢ per part

This part measures only 1.69 OD, and contains 12 holes. Most of these are partial holes. The machine has two Vertical Units and nine Horizontal Units operating 20 spindles in all. Close center distances prevent the use of more than two spindles at any one unit. Rigid tolerances must be held.

Brass Padlock Body 1 c per part
6 Operations from 2 directions

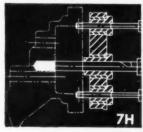
.094 drill
4.48
NF tap
089 drill
.300 c bore

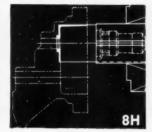


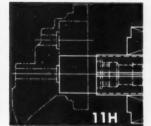
Brass Padlock Body 460 parts per hour gross 1 1/10¢ per part

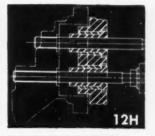
This is a comparatively simple machine with six operations, four horizontal, two vertical. It drills, c'bores, reams and taps—all automatically. The machine is compact with 60" diameter base, 12" diameter index table, six fixtures and six drilling units. Bushings guide drills and reamers.

as it produces 200 parts per hour gross at 97 c each









Units 8-H, 9-H, 10-H, 11-H

Here we work on the thru-holes and large bores with combination tools; really the most interesting operations. Drawings 8-H and 11-H illustrate these operations. A 1.680 hole is rough bored at both Unit 8-H and 9-H, each with a flat bottom and .750 c'bore. These two 1.680 holes then receive a semi-finished bore with flat bottom at Units 10-H and 11-H.

Unit 12-H. The .484 holes bored at 4-H and 5-H receive a semi-finished ream.

Unit 13-H with six 10-32 NF taps performs the tapping operation in the six holes drilled by Unit 2-H.

Operator stands at the 14th station when he loads and unloads the machine. An air cylinder clamps and unclamps the work fixtures.

Each Unit Cost on the drawings

includes the cost of the man and of the machine — no power or overhead. We assumed:

Unit cost of man equal to:

average U. S. hourly wage hourly gross x 80% efficiency

Unit cost of machine to be:

price of tooled machine output in 6000 hrs. @ 80% efficiency



ready to place the <u>right</u> plastic parts right into your hands

Successful production of this sub-base for aircraft control panels by PRP gained these major advantages through this brand-new use of glass filled Plaskon Alkyd 440A...total cost was materially reduced by the elimination of approximately 140 separate parts... greater resistance to deformation...easier wiring and assembling of other components into a more trimly compact, better looking panel. PRP worked closely with customer engineers in developing this notable application of Plaskon Alkyd — stands ready to work with you toward improving your product and profits. And our plane stands ready now to bring you here for a time-saving (and probably a money-saving) meeting.

when you look for plastic moldings, look first to Plastic Research Products, Urbana, Ohio



Radio-Controlled Industrial Trucks

(Continued from page 39)

of this equipment is of the gravity roller variety. There are also many electric hoists used to cut down still further on any manual effort. Exide engineers state that the accident rate has been reduced considerably due to the use of modern methods for handling. This is particularly true in the case of acid burns from spilled containers which were formerly handled manually. According to one Exide engineer, the main object has been to minimize handling and finally to simplify whatever handling remains.

Expendable pallets are utilized to a great extent for transporting most of the materials used by the plant and also for shipping finished products. Everything coming into the plant is palletized if not received in that fashion. As a matter of interest, the plant utilizes from 30,000 to 40,000 pallets per year. These are of wood construction and are made in a standard 40 in, size for both rail and truck transportation. Pallet cost runs in the eighborhood of \$3.00 per pallet, or a total cost of \$90,000 to \$120,000 per year. All of the pallets used in the plant are made by Exide personnel.

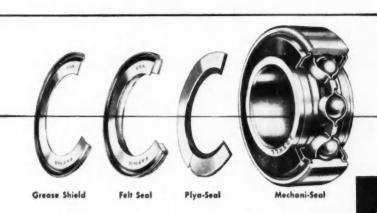
Packaging also has been revamped with the move to the new plant. Practically every load is palletized, as mentioned, for ease in shipping and for the customers' convenience in unloading. Small parts and many other finished products are packed in corrugated board containers, palletized and strapped with Acme equipment. Large pieces are placed on the pallets and suitably covered for protection against the elements and physical damage. These pieces are also strapped to prevent shifting in transit. With the use of new methods, the breakage problem has all but been eliminated.

Clevite Stocks Bearings for English Cars

Clevite Service, Inc., under a licensing arrangement with Vandervell Products, Ltd. of England is distributing a line of replacement engine bearings for the most common makes of English cars. The main and connecting rod bearing line will be distributed through NAPA under the name Monmouth. Bearings will be available for Austin, Ford, Hillman, Standard, Vauxhall, Morris and MG Cars

"IRON CURTAINS"

TO KEEP OUT SABOTEURS OF FARM EQUIPMENT



(Various combinations of seals and shields are also available.)

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Four basic types of sealed and shielded Fafnir bearings are designed to meet practically all requirements . . . from the exclusion of coarse dirt or chips to complete protection against the loss of lubricant and entrance of foreign matter.

Better, longer performance isn't the only advantage of Fafnir Ball Bearings with "Iron Curtains". Manufacturing costs can be cut, assemblies simplified, and machining operations eliminated. To find out what advantages Fafnir Sealed and Shielded Bearings can offer you, call in a Fafnir Representative. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR

BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

Lead-Backed Masking Tape Solves Plating Problems

(Continued from page 82)

Moreover, when used on exterior surfaces it had to be secured by a wirewrapping, which was time- and laborconsuming and even then did not always give good results. It also raised the possibility of etching due to the close juxtaposition of the two metallic surfaces and the resulting galvanic action.

For these reasons, P&WA explored

the use for masking of a lead-backed tape with a pressure-sensitive adhesive. It was found that not only did it save considerable time and labor in application of the masks but also successfully prevented etching, and gave a thoroughly satisfactory thieving action. We have, therefore, entirely eliminated the use of aluminum and lead foil masking in chromium

plating operations, in favor of the lead-backed tape.

Pratt & Whitney Aircraft had first demonstrated the advantages of the lead-backed masking tape for nickelplating a thin-walled stainless steel assembly for a J-48 jet engine.

This assembly called for the deposit of a heavy nickel plate, which under the original procedure was plated 0.017 to 0.020 in. thick on the internal diameter, and was then machined to final dimension. Nickel was required right up to the edge of the end face of the assembly. The work was coated all over with wax and then put through an appropriate cleaning cycle prior to nickel plating. During cleaning and plating operations ID anodes were used. A modified Watts solution, at a pH of 1.5 to 2.5, was used for plating. High current density was required in order to deposit nickel as rapidly as possible within the limits of available plating equip-Consequently, considerable build-up or "treeing" of the nickel occurred, especially on the end face, extending beyond the OD of the assembly and thus requiring machining. Etching also was a problem because of the low pH of the solution being used

To prevent build-up of the nickel beyond the OD, P&WA experimented with various masking media. utilizing the lead-backed masking tape, it was applied to the OD of the assembly, exposing a band approximately 1/4 in. wide adjacent to the area to be plated. The remaining portion of the assembly was then waxcoated. Tests showed that the leadbacked tape would adhere to the metal sufficiently well to completely seal out the nickel solution and would itself plate satisfactorily.

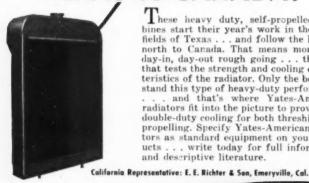
This was confirmed in subsequent production runs. Nickel, that form-erly built up as "trees" on the part, now plated onto the exposed lead tape and was easily removed, along with the tape, by means of pliers, leaving the steel surface with no etching or other detrimental effect from the operation. The nickel deposited on the lead tape was readily salvaged.

The success of these experiments led P&WA to try the lead-backed tape on other plating operations. It can be applied to any surface quickly and easily and with no risk of its slipping out of position or working loose. Parts which formerly took as long as half

(Turn to page 110, please)



...work their way from TEXAS to CANADA!



hese heavy duty, self-propelled combines start their year's work in the grain fields of Texas . . . and follow the harvest north to Canada. That means months of day-in, day-out rough going . . . the kind that tests the strength and cooling characteristics of the radiator. Only the best will stand this type of heavy-duty performance and that's where Yates-American radiators fit into the picture to provide the double-duty cooling for both threshing and propelling. Specify Yates-American radia-tors as standard equipment on your products . . . write today for full information and descriptive literature.





AMERICA'S cars, traveling more than a billion miles every day, are expanding AC's reputation for top quality automotive equipment. For, over 90% of those cars are equipped with one or more of AC's 22 products.

AC has an impressive list of more than 300 manufacturing customers who find that AC equipment units conform to highest standards of quality in every respect. Experience has proved to them that AC products deliver top performance and have long-life serviceability.

If you are faced with problems that concern the quality of your product, AC engineers will work with yours - and bring you the benefit of AC's vast facilities and know-how.

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FLINT-1300 North Dort Hy. CHICAGO-Lincoln Tower Bidg. DETROIT-General Motors Bidg.

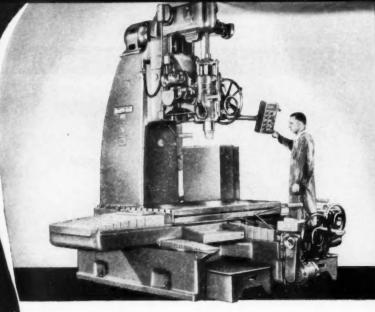


PLUG DIVISION GENERAL MOTORS CORPORATION

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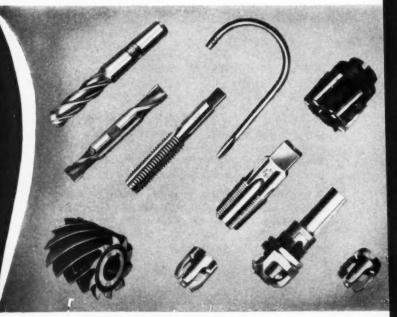
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You'll be making the "First Choice for Accuracy" when you call in Pratt & Whitney. The P&W Representative is a trained specialist in machine tools . . . machine tools that will bring tool room standards of accuracy to your production line. Don't settle for less when straightline, factory-direct skill and knowledge are yours for the asking.

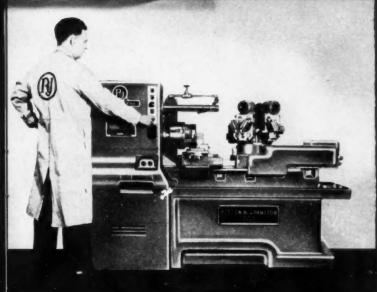


If it's Cutting Tools

there's the best for every job in the complete P&W Line

Talk to the man who talks your language . . . the Pratt & Whitney factory-trained cutting tool specialist. In direct contact with the factory and the rest of the P&W family of specialists, he places a wealth of knowledge at your disposal. From start to finish, you're way ahead of the game when you call in Pratt & Whitney.

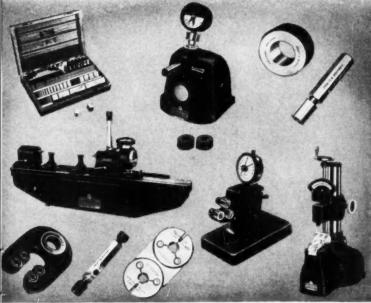
Pratt & Whitney Branch Offices maintain comprehensive



If it's Automatics PLUS Tooling

like the Potter & Johnston Automatic Turret Lathe

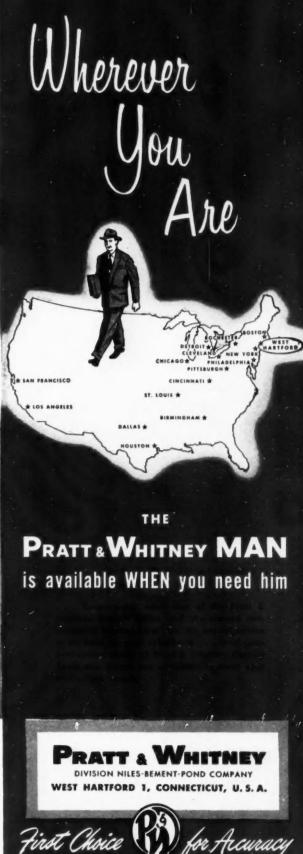
When profitable production calls for a high output of precision parts, you can help yourself to greater speed, accuracy and economy with a call to your Pratt & Whitney-P & J Representative. Thoroughly experienced in practical manufacturing problems . . . and working closely and constantly with our factory engineers, he'll make sure that you get the P&J Machines plus P&J Tooling best for your specific needs.



If the Gages to maintain the master and working standards in Industry

The Pratt & Whitney Man you'll talk to is a Gage specialist who represents a Company which manufactures a great variety of gages and gaging equipment. When he recommends the right gage for your job, you can be sure he's thinking about your problem ... not merely trying to sell the only thing he has to offer from a limited line. In every gaging problem, there's one type of P&W Gage that does the job better than any other ... and that's what he'll recommend.

stocks of regularly listed Cutting Tools and Gages.





HELPS YOU CALIBRATE

HERE, while the spot welder is in operation, a Brush Analyzer records amplitude and timing of both input and welding current on the same chart. By checking the wave shapes, inspectors are able to calibrate controls quickly, and assure top quality welds at all times.

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Versatile Brush Analyzers save you time in analysis of operation of all types of spot welding machines... and in studies of a-c or d-c voltages or currents, strains, stresses, displacements, and other static or dynamic conditions. Brush representatives are located throughout the U.S. In Canada: A. C. Wickman, Ltd., Toronto. For free bulletin write Brush Electronics Company, Dept. DD5,3405 Perkins Avenue, Cleveland 14, Ohio.



PIEZOTRONICS...Brush has prepared this informative 24.page brochure describing the functions and applications of piezo-electric materials. Write for your free copy — it may spark a product development idea.

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INDUSTRIAL AND RESEARCH INSTRUMENTS
PIEZOELECTRIC MATERIALS . ACOUSTIC DEVICES
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COMPANY

formerly
The Brush Development Co.
Brush Electronics Company
is an operating unit of
Clevite Corporation.

Lead-Backed Masking Tape

(Continued from page 106)

an hour now can be masked in five minutes. The tape can be just as successfully used on interior surfaces as on outer ones, and on parts that could not be properly masked easily by any other method.

The non-slip characteristic of this masking tape is especially desirable when selective plating parts which require an accurate line of demarcation. For example, we are plating a variety of propeller shafts and crankshafts where thieving is required at the edge of the areas to be plated. This is done now by applying the leadbacked tape, after which the parts are wax-coated all over and the wax then scraped from the areas to be plated. Upon completion of the plating operation, wax and tape are removed and it is found that no additional cleaning or grinding of the areas adjoining the plated areas is required because the lead tape holds the line where it was originally ap-

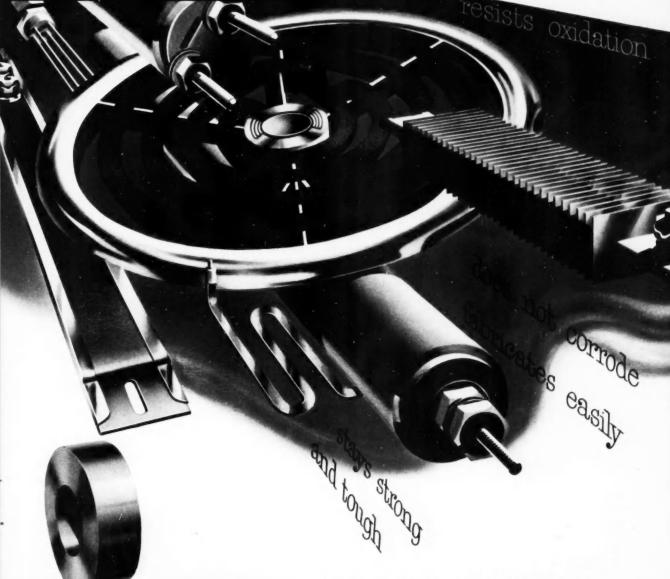
Another example of the advantages of the easily-applied lead-backed tape is an operation involving stripping of silver plate from link pins which have chromium-plated ends. To prevent stripping these ends, they are wrapped in the lead-backed tape before stripping the silver.

Still another example involves the use of the tape to mask portions of crankshafts which are to be chromium plated on the face splines. In order to produce a satisfactory plating job, with metal uniformly distributed on these splines, the areas adjacent to the splines must be thieved so that the chromium does not build up on the ID or OD edges. However, the areas to be plated are processed through an inhibited acid prior to the chromium plating, and the masked areas must not be exposed to the action of this acid because of the critical dimensions of these areas. When lead-backed tape was used, thieving was effectively accomplished yet the tight seal prevented any acid etch of the nitrided areas which had been mesked.

The tape is used also for masking portions of crankshafts which require selective nitriding. Tin plate is used as a stop-off of some areas of the shaft to prevent nitriding. Original masking fixtures did not seal successfully, but when lead-backed tape was applied before the masking fixtures, sealing was satisfactorily completed.

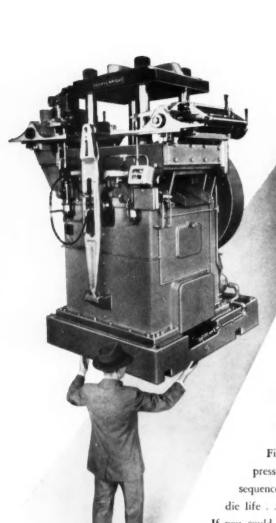
Type 430

for heat applications



CORPORATION CARNEGIE, PENNSYLVANIA In the broad electric heating field, from domestic ranges to heavy-duty industrial units, Superior 430 Stainless enjoys time-tried favor. • Used for trim rings, coil supports and medallions of range elements, this sturdy steel stays bright, stands up to heat, resists abrasion. As sheathing for high-temperature strip, ring, tubular and cartridge heaters, Superior 430 Stainless fabricates smoothly, easily and resists corrosion.

• Our 430 Stainless is available in easy handling coils. Write!



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If you could get these cost-cutting, labor-saving, inspection-reducing benefits, you wouldn't wonder whether you could afford a Henry & Wright Dieing Machine now, You'd decide, "How can I afford to be without it now?" Well, let's talk serious business, because those are just the benefits everyone gets with Henry & Wright Dieing Machines -and, brother, how the Sales Department will love that price cut you'll give them.

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NEW CATALOG Get up to the minute facts on Dieing Machines capacities range from 25 tons to 2500 tons. Write Henry & Wright, 491 Windsor St., Hartford, Conn.

SOVIET AUTOMOBILE INDUSTRY

(Continued from page 51)

major components in several other, modernized vehicles continue old designs without change, e.g. the GAZ 51 and 63 transmission, inherited from the GAZ (Ford) AA. Beyond this, the Soviets have not always been able to carry out their own design intentions. For example, they planned to use 12-volt batteries in the GAZ 51 and ZIS 150, but are actually utilizing older 6-volt types. The GAZ M20 and ZIS 110 passenger cars both exceeded their planned vehicle weights by more than 250 lb; the YaAZ truck. by 725 lb. In all, Soviet automotive design is still characterized by dependence upon foreign prototypes, with a large and growing lag; by the continuing use of obsolete models; and by considerable gaps between intention and accomplishment.

To summarize: Since the end of World War II, the Soviet Union has considerably expanded and partially modernized its automobile-producing capacity. Current output is about 400,000 vehicles, largely trucks, or almost twice the prewar peak. Designs were modernized substantially in 1945-46, but with little change since then. Some models of the early 1930's still are in production. The basic characteristics of Soviet design noted in 1948 are still true today. As a result, the economic and military effectiveness of the motor vehicle inventory on hand and in production is open to some question.

BOOKS ...

GAS TURBINE PROGRESS REPORT, published by The American Society of Mechanical Engineers, 29 West 39th St., New York 18. N. Y. Price, \$1.50. This report not only surveys gas turbine applications in the automotive, railroad, aviation and marine fields, in central station, and in specialized industry but reviews progress achieved in improving materials, cooling methods, fuels, and in the performance of gas turbine components. Other contributions forecast probable trends; and consider some of the problems which have to be solved before the gas turbine can be more generally applied.



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FACTORIES: DETROIT, MICHIGAN-SHELBY, OHIO

Controlled Heat Treating of Landing Gear Struts

(Continued from page 53)

or 4340 steel and have to be of 40-42 RC hardness after heat-treating. Several parts are tubular and some are quite bulky. All are handled in stainless steel racks or cradles both for convenience and to hold the work in favorable position both for heating and quenching. Tubular parts are

drilled to admit quench oil and to permit of draining it readily before quenched parts are transferred to the draw furnaces. Although furnaces have 1400-lb capacity, an average load weighs 500 to 1000 lb.

High heat furnaces are equipped with circulating fans having watercooled bearings, the fans being used, of course, to circulate the controlled atmosphere and help to keep all parts of the load at uniform temperature. In these furnaces, parts are held at 1575 F for 11/2 to two hr and then are lifted out with the rack by crane, and are quickly lowered into the quench tank. Average time for such transfer is about 15 sec and involves a temperature drop of not more than 50 F.

To facilitate getting the crane hook into the rack loop quickly, above the hot furnace, the hook has been equipped with a short bar welded to its lower side, as illustrated. This bar hangs nearly horizontal and has a bayonet cross pin near its inner end. Over the bar fits a shifter pipe having a bayonet slot to engage the pin. When thus engaged, the hook is easily moved to desired position and is as easily disengaged when desired. This simple device is convenient and safe for the operator and helps to expedite transfer of parts from furnace to quench and from quench to draw furnaces and cooling pits.

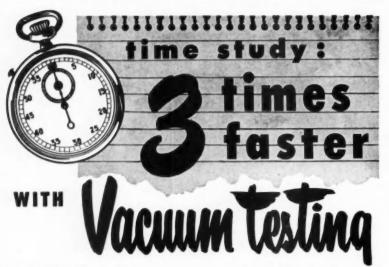
Quench tanks have a capacity of 1200 gal and the oil is not only circulated rapidly and agitated within each tank as quenching proceeds but is changed once a minute by a high volume pump that handles 1200 gpm. Quench oil, which is a Gulf type and has a flash point of 375 F, is drawn from 10,000-gal storage tanks in the basement and is held by live steam heat exchangers at 135 to 140 F.

With the rapid circulation and agitation of the quench oil, average loads are brought to quench oil temperature in about 15 sec. Long parts are held vertically by the racks used and so undergo little or no distortion as the load is lowered into the quench. Vertical rack components are tubular and are so made that they cause a sort of percolator action that helps to promote quenching action.

Upon completion of quenching, the rack of parts is elevated and allowed to drain completely before transfer to the draw furnace. The latter is held at 900-960 F and any considerable oil remaining in the parts would flash and burn in the draw furnace which is not desirable.

Time at temperature in the draw furnace is about two hr, after which the rack of parts is lifted out by the crane and is set in an adjacent pit for slow cooling. All batches heat-treated include test bars that are subjected to subsequent hardness and tensile tests as a check on the procedure and steel quality.

In the instrument room there are not only indicating and recording pyrometers for each furnace but "Microcarb" controls that feed the



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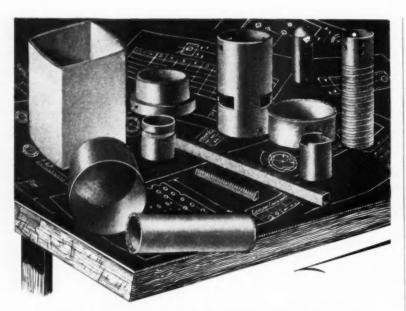
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Homocarb fluid to furnaces and give automatic checks on the atmosphere in the furnaces. Adjustments are such that neither carborization nor decarborization will occur and the 0.40 carbon content of the steel will remain fixed.

Also included in the instrument room are time controls as well as alarms that sound in the event that overheating should occur. Furnaces have vents for rapid cooling in an emergency. Records are kept, of course, on every batch heat treated. These include not only the automatic graphical records from instruments but entries as to time in and out of furnaces and on the code number assigned to each batch of steel. Hardness is checked on all parts heat treated and records made thereon, as well as on the physicals determined from the test bar in every batch. These data are entered in the log kept for every batch.

All these records have to be certified by Air Corp inspectors before heattreated parts can be put through such other processing as is required subsequent to heat treating. Both the methods used and the equipment employed are in accord with Air Corps specifications. All are such as to insure end products that withstand the high stresses and shocks and meet the severe service conditions to which the landing gears of heavily loaded planes, that must take off and land at high speeds, are subjected.

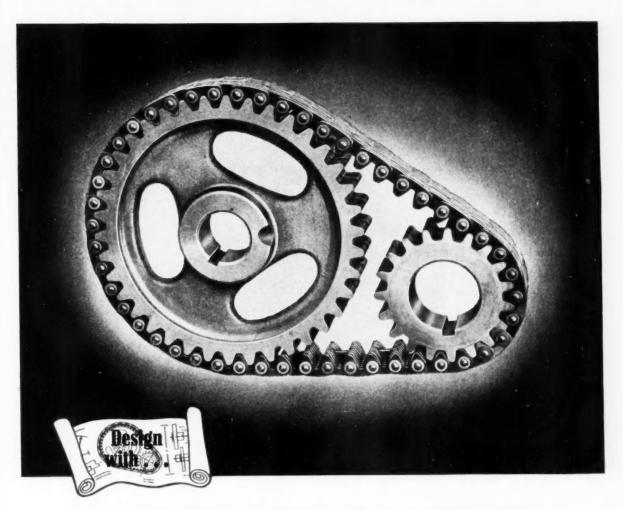
By having most of the furnaces and of quench tanks in the basement, their components are readily accessible and are easily serviced. Such an arrangement keeps the heat-treating floor clear and all piping as well as storage tanks for quench oil where they are out of the way and yet accessible. Each quench tank is connected to its own storage tank and has its own facilities for circulating the oil as well as for keeping the oil at the required temperature.

Considered as a whole, the heattreating setup is as close an approach to the idea as an installation in a building not originally designed for the purpose can provide. All exacting operating conditions are met with high economy and only two men, exclusive of supervisory personnel and maintenance workers, are required on the heat-treating floor.

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Segmental bushings are made with slight bow.



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Bow in bushing acts to keep a snug joint, main-taining chain pitch auto-matically.

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Cincinnati engineers studied the cleaning problem, and adapted a Cincinnati wash, rinse, and dry belt-conveyor washing machine to the job. With this machine, results are "much better," and the work is done by only two operators working just three hours per day.

If you have no automatic cleaning equipment, or if you wish to modernize your present equipment to reduce your costs, consult Cincinnati engineers. From long experience, they can show you by case histories closely approximating your needs how a Cincinnati machine or system can improve your cleaning and reduce your costs. Write for latest literature.





One manufacturer now builds a truck to each three passenger cars. Thirty-four years ago the ratio was a truck to each 100 passenger cars.

An average day's output of car heaters by a well-known maker is capable of dissipating enough heat to make 1400 nine-room houses comfortable on a zero day.

It is estimated that 60 million Americans use motor vehicles to get to and from work or school every day, and that traffic bottlenecks cause the average driver to lose about 10 minutes on each trip. That means a total daily time loss of 20 million hours.

A fuel pump diaphragm flexes as many as 3000 times a minute while in operation.

The rockets carried by a single all-weather interceptor have destructive power approximately equal to eighteen 75 mm cannon projectiles.

Design and development of a single heavy bomber today requires almost 20 times as many engineering hours as in World War II.

In 1952, 45 million passengers flew more than 24.5 billion passenger miles (and more than one billion plane miles) on world airlines. Eighty per cent of the aircraft operated by these carriers are built in the United States.

When American jetliners zoom into the skies—and that should not be too far away—they will fly to speeds of more than 560 mph. carrying in excess of 60 passengers, and be capable of crossing the U.S. in four hours, or of flying across any ocean or continent non-stop in record time.



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Progressive, eyes-ahead engineering is one of the big reasons why so many truckers pick Cummins Diesels for dependability.

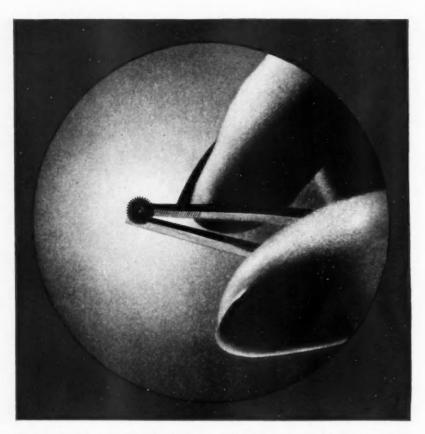
Consider Cummins' exclusive system of fuel injection and metering—an important factor in the unequalled performance records established by lightweight, high-speed (60-600 h.p.) Cummins Diesels. No other Diesel fuel system is so simple...so rugged! It delivers a uniform, properly prepared fuel charge to every cylinder. All under low pressure.

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Hour wheel, .140" diameter with 32 teeth, hobbed with a Barber-Colman apecial fine pitch hob. Thickness of teeth may not vary more than .0003" on each wheel.

PRODUCTION HOBBING OF PRECISION FINE PITCH GEARS

Up to 270 Diametral Pitch

The high production of accurate fine-pitch gears is a development of Barber-Colman Company. Special techniques have been developed for the manufacture of hobs as fine as 270 D.P. Fine-pitch hobs can be furnished from Class AA to Class C to meet your specific accuracy requirements. Multithread hobs are available for maximum production. In addition to hobs, Barber-Colman makes the machines to hob these fine-pitch gears. Most of these gears are cut on the No. 1-1/2 and No. 6-10 Hobbing Machines, but the Precision No. 6-10 is used for maximum accuracy.

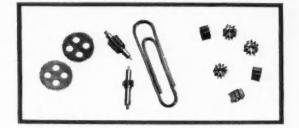
As far back as 1936, Barber-Colman Engineers were making hobs and machines for cutting gears as small as ½" diameter and with teeth as fine as 160 D.P. Continuous development since this time has resulted in standard production techniques for gears up to 270 diametral pitch. Unground hobs are available to 270 D.P., ground hobs to 200 D.P., and carbide-tipped hobs to 150 D.P. Such tolerances as .0003" total composite error and .0002" tooth-to-tooth composite error are possible on gears of the finer pitches.

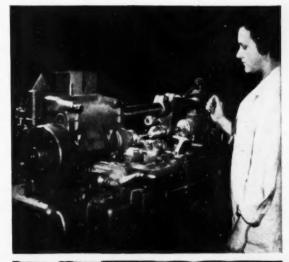
120 D.P. Instrument Gears

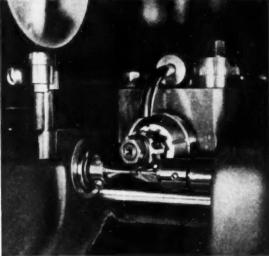
Typical of the range of fine pitch work in the plant of a large precision instrument maker, this hobbing job requires a good grade of commercial gear on a high volume basis. A battery of three Barber-Colman No. 6-10 Hobbing Machines produces 6000 gears per hour with 50 blanks mounted on an arbor. Close tolerances are consistently maintained at this rate of production. Fast loading and unloading is accomplished with air-operated tooling equipment. Here are the specifications: 50-tooth Spur Gears, 120 D.P., .422" O.D., .030" face in brass. Hob—1½" x 1" x ½", Ground Multithread. Feed per revolution of work .020"; Hob Speed 1200 rpm.

180 D.P. Pinions

On another job, precision small pinions, .111" O.D. x .086" face, 18-tooth, 180-pitch are hand loaded and hobbed within a tolerance of .0003" on the pitch diameter on the No. 1-1/2 Hobbing Machine. Since extra fine finish is required a feed of .012" per revolution of work is used with an hourly production of 270 gears. Hob speed is 1795 rpm. A Barber-Colman ground hob, 3/4" O.D. x 1/2" x .315", averages 850 pinions between sharpenings. Special tooling for magazine loading of the No. 1-1/2 machine is available as extra equipment.







When you require small gears, in pitches up to 270 D.P. in high volume production with close limits of tooth accuracy, call your Barber-Colman representative for assistance. With the precision and engineering built into Barber-Colman Hobs and Machines, he can help you reduce such problems to ordinary gear cutting procedure.

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HORC AND MACHINES SINCE 1911

SAE Aeronautic Meeting

(Continued from page 59)

Titanium Session

Titanium is no longer considered a difficult material to machine according to some individuals attending the titanium session. Much debate centered around this subject, but there were no definite conclusions. Titanium production for 1953, 1954, and 1955 was forecast as 2000 tons, 5000 tons,

and 12,000 tons respectively. Hot forming of titanium alloy sheet is claimed more widely used than cold forming methods. Welding, also, was said to be much improved. Panel members stated that some of the current production uses of titanium are compressor wheels, blades, combustion liners, bulkheads, and shrouds—all for jet engines.



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Blades and Buckets Forum

At the jet engine buckets and blades forum, much time was devoted to the subject of checking and inspection of blade airfoil. The pros and cons of air gaging were discussed along with a critique on some of the equipment. Optics also were considered, but it was felt that the cost is too high at the present state of the art. The various grinding methods employed in the manufacture of buckets and blades also was a major topic. Several engineers agreed that wet tumbling appears to be a very good method for obtaining a good surface finish on the products discussed. With this method the blades are fixed to prevent physical damage and the barrel speed is in the neighborhood of 500 sfpm. All agreed that there is no set method for bucket and blade manufacture. It depends upon the end use of the product and the makers past production experience.

Quality Control

The most interesting item to come out of the meeting on manufacturing management was the expanding use of office quality control in several companies. Technical graduate competition between firms, training courses, testing, and mechanical office equipment also were discussed. An engineer stated that in one company 10 to 12 per cent of the management jobs must be filled each year.

A very interesting debate was held in the session on inspection and quality control. It was claimed that three companies receiving a like product from the same source have three different quality standards. product maker wanted to know why the companies couldn't get together and decide on a common quality. On the other hand a product user being supplied by six makers, all making the same product, wants the makers to decide on a common quality standard. Another debate centered around the fixing of responsibility between the engineering department and the production department for the quality of the end product.

Forgings and Castings

Concerning the large forgings and castings forum, most of the discussion was on the heavy press program. One interesting point brought to light was that there are very few orders on the books for large forgings that will be made by the huge presses which are now in construction. Porosity of aluminum ingots was discussed at some length, with the aluminum manufacturers stating that the problems

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are being corrected as rapidly as they arise. Some of the engineers present talked about the use of grade B castings when the product item is to be used for an expendable object, such as a guided missle. A great deal of money could be saved if this idea were carried out, it was claimed. In addition, problems on thin-walled castings and casting tolerances were presented to the panel.

Forming and Joining

High temperature brazing, fusion welding, surface finish for spot welding, and the joining of ceramic coated materials were the highlights of the precision forming and joining session.

At an early morning press conference, Roy T. Hurley, chairman and president, Curtiss-Wright Corp., and sponsor of the Production Forum, stated that the United States must spend more time and money in researching manufacturing processes. He went on to say that during the past five years the aircraft industry has spent many times more for engineering research than has been spent on studying production techniques. As an example of production research, he mentioned that the first jet engine blades cost as much as \$90 each in the small quantities then needed. In contrast, the blades of today can be bought for just a few dollars in many instances. Speaking on a machinability program, he stated that such a program brought back a 10 to 1 return in the case of Curtiss-Wright-\$156,000 invested with a return of \$1.5 million.

One of the new aircraft items on exhibition was the Torque Link hydraulic steering gear for nose wheel installation. It is said to eliminate the drag brace and damper, and lengthen brake life. According to the maker, Bendix Aviation Corp., the unit has been installed in a twin-jet Beech with a very minor weight penalty. In larger planes there is said to be no increase in weight.

Technical Sessions

At the technical sessions, George R. Keller, North American Aviation, Inc., explained that the components of hydraulic systems, such as pumps, seals, valves, filters, and fluids, now designed to withstand temperatures only to 165 deg, will be unsatisfactory in greater heat, and new materials must be found.

A proposal was made by Howard Field, Jr., Consolidated Vultee Aircraft Corp., that hydraulic systems be simplified and then composed of units which are of proved dependability.

Development of wind tunnel facili-(Turn to page 128, please)

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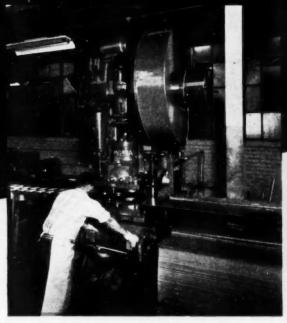
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2, 3. Cupping and Redrawing on A-5½ Presses with Air Sleeve Clutches.

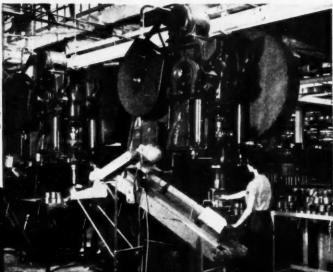


4, 5, 6, 7. Indenting end on A-3½ Presses.





8, 9. Forming hexagonal shape and Ironing side wall on A-5½ Presses with Air Sleeve Clutches and with Niagara Cushions.



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(Continued from page 124)

ties which permit testing of turbojet engines at simulated altitudes as high as 55,000 ft and at temperatures from -30 F to 350 F was described by William A. Fleming and H. Dan Wilsted, Lewis Flight Propulsion Laboratory.

A British engineer, C. H. Jackson, British Overseas Airways Corp., said that the British have turned to jetliners because of inability to compete in the production of long-range, piston-engined transports, and are hoping that reduced fuel consumption and increased payloads of future jetliner models will solve the admittedly serious economic problems involved. J. W. Barton, Boeing Airplane Co., reported that inflation has increased the cost of jetliners from \$3.5 million to \$5 million each.

R. R. Bayuk, Wright Air Development Center, advocated the use of the pneumatic system for acuating aircraft components. He stated that low-pressure pneumatic systems can obtain air from jet engines, thereby simplifying equipment, and with refrigeration needed only at the compressor.

The installation of jet engines in attached nacelles on aircraft wings so as to facilitate the use of continuous wing structure housing fuel tanks was recommended by B. T. Salmon, Consolidated Vultee Aircraft Corp., at one of the technical sessions.

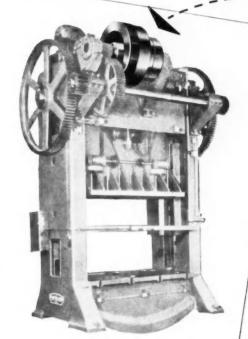
BOOKS ...

SYMPOSIUM OF DETERMINATION OF ELASTIC CONSTANTS, published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, \$2.00. The revival of interest in recent years in the determination of elastic constants has indicated a need not only for more accurate knowledge of known elastic contants and their extension to ex-treme temperatures, but also a need for new techniques covering such relatively new materials as plastics and composite materials. In recognition of these prob-lems the Task Group on Elastic Constants of Committee E-1 on Methods of Testing sponsored the present series of papers at the June, 1952, Annual Meeting of the ASTM. The symposium is opened by an analysis of returns from a questionnaire on the needs regarding elastic constants and on current practice in their determination. An ingenious static method for modulus determinations at elevated temperatures and its application to steels is described in the second paper. Static and dynamic methods for non-metals are surveyed in the third. Dynamic methods with their advantages and limitations are discussed in the fourth paper. The symposium is closed with a comparison of values of elastic constants for a beryllium-copper alloy obtained by several static and dynamic methods.

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remember

the press production delays we used to have due to clutch failure? Well, this Cleveland Clutch has stopped all that. The boys say it's easy to adjust and service without removal from the press. Maintenance expenses have dropped way down.

Operating costs are down, too. The lightweight design of the unit requires less horsepower for operation yet gives us quicker starts and stops. It's so efficient I'd like to put new Cleveland Clutches on our older presses."

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GETTING GREATER FLEXIBILITY, MAXIMUM UTILIZATION OF SCARCE STEEL WITH SMALLER



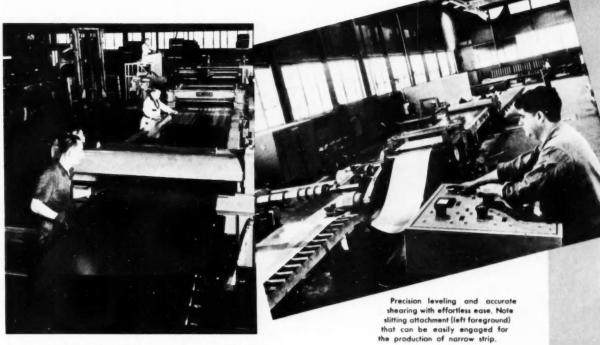
Neat, trim business office of Hauserman panels. Note clean window lines and wainscoting. Hauserman now can produce any necessary width from wide coils, eliminating heavy steel inventories.

The E. F. Hauserman Company, Cleveland, required to the world's largest manufacturer of well movable steel partitions and wainscot aged panels. Their operation demanded flat steel ties of of innumerable dimensions, trimmed and Add to leveled to precision flatness. As the sheets ations required to commercial tolerances, or a light to 5 feet. buckle of not over 1/4" high. But in the manufacturing of Hauserman partitions, they insisted on the maximum tolerance of 1/16", or stock larger size they were need to the steel mills had met Hauserman's flatness necessary waste.

weland, requirements, but it was costly for them as well as Hauserman. Steel producers encournscot aged Hauserman to look into the possibilisteel ties of providing their own leveling facilities. Add to this the fact that Hauserman's operates ations required sheets of many sizes in lengths from 3 to 12 feet and widths from 1 to 5 feet. In using mill sheets Hauserman had either to stockpile multiple lengths and widths to obtain a flexible inventory or to stock larger sized sheets and trim them as they were needed — which resulted in un-

Solution...

WEAN COMBINED SLITTING, SHEARING AND LEVELING SET-UP FOR MANUFACTURING PLANTS PROVIDES THE ANSWERS....



Receiving end of Wean shear line shows compact, easily maintained arrangement. Elevated control stand permits full view of all operations.

Encouraged by basic steel producers Hauserman engineers decided to do their own slitting, shearing and leveling. Working with Wean Equipment Corporation's engineers a complete operation was designed and built that enables Hauserman to buy commercial coil stock in a minimum of widths, shear to desired dimensions, level as required — to maintain complete stocks with a minimum Winventory.

The first station on the Wean line is an uncoiler from which the stock passes into a gang slitter where it is edge trimmed and slit to desired widths. The steel may then be recoiled and stored. When sheets are desired, the stock by-passes the recoiler and enters the flying shear to be cut in sheet lengths. Semi-automatic roller conveyors enable Hauserman to move the steel to storage or to send it through the leveling section of the line where the roller leveler actually delivers improved flatness over the stretcher leveled stock formerly used.

THE ANSWER IS RESULTS . . .

Wean maintains perhaps the most experienced staff of special machinery and equipment engineers and construction craftsmen in the nation.

Whatever your special machinery problem, your engineers can have this result-getting combination by contacting Wean Equipment Corp., 22800 Lakeland Boulevard, Cleveland, Ohio.

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EQUIPMENT CORPORATION

Cable: Weancor Cleveland, Ohio



One-piece, precision-built Apex SN Nut Setters offer several advantages not found in two-piece socket-extension combinations. Power is applied direct from gun to work . . . full torque is developed . . . operation is faster, safer—and easier on tools and on tool operators. There are no movable parts, joints or locking devices to cause vibration, backlash and excessive loss of torque.

Apex SN Nut Setters are available with the following hex shank drives—¼" (standard and

bolt-clearance type); ½6", ½" and ¾" (standard type). Broached openings, Hexagon: ¾6" to ½"; Square: ¼" to ½". If your power tools take a hex shank, you can use Apex SN Nut Setters on your work, and save time, money and manpower—now!

CATALOG 29 contains complete information, specifications and illustrations of over 5.000 Apex impact sockets, extensions, adapters, universal joints and other production tools. Write, on your company letterhead please, for your copy.



sockets, extensions, adapters

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1043 S. Patterson Blvd., Dayton 2, Ohio

POWER BITS, INSERT BITS AND BIT HOLDERS, FOR PHILLIPS, FREARSON (Reed & Prince), SLOTTED, CLUTCH HEAD and SOCKET HEAD SCREWS • HAND DRIVERS FOR PHILLIPS, FREARSON AND CLUTCH HEAD SCREWS • TWO-PIECE DRIVERS FOR HEX HEAD SCREWS • SOCKETS, EXTENSIONS, ADAPTERS AND NUT SETTERS • UNIVERSAL SOCKETS, EXTENSION WRENCHES AND ADAPTERS • AIRCRAFT AND INDUSTRIAL UNIVERSAL JOINTS • SELF-RELEASING AND ADJUSTABLE STUD SETTERS • SAFETY FRICTION TAPPING CHUCKS • VERTICAL FLOAT TAPPING CHUCKS.

The Business Pulse

(Continued from page 78)

management dispute, the steel industry has continued to produce at capacity or near-capacity levels. Current opinion holds that a condition of approximate balance between supply and demand is not likely until sometime in the fourth quarter of the year.

High Production of Durable Goods

Many durable-goods industries are operating at higher levels than they were a year ago. In the forefront of the advance is the automobile industry, which produced 50 per cent more vehicles in the first quarter than in the corresponding period of 1952. A further substantial increase in output is indicated for the second quarter. Some analysts are of the opinion that these extraordinary rates reflect overoptimistic expectations on the part of producers and that sharp curtailment will be necessary later in the year. This view seems to be based largely on the fact that dealers' inventories have risen, although the significance of this is questioned in view of the seasonally active spring and summer periods still ahead.

Construction also has been very active, with a first-quarter total six per cent above that of a year ago. Because of the unseasonably mild weather in the early months of the year, the question has been raised whether some construction during that period consisted of work that normally would have been done later in the season, with the implication that activity in subsequent months may be correspondingly reduced.

Inventory Accumulation Declines

A significant approach toward balance between total production and demand is indicated by official estimates of gross national product for the first quarter. Personal consumption expenditures, outlay for new construction, investment in producers' durable equipment, and Government purchases all registered gains above the levels of the preceding quarter, while inventory accumulation declined from an annual rate of \$8.1 billion to one of \$2.5 billion.

The increase in personal consumption expenditures apparently reflected a combination of higher income and a lower rate of saving. A continuation of this greater tendency

to spend current income rather than save it could be an important factor in offsetting the effects of a decline in defense expenditures, should one occur. In this connection, it is to be noted that the rate of saving still is high by historical standards, notwithstanding the recent decrease.

Favorable expectations concerning the volume of consumer demand are supported by a recent survey conducted by the University of Michigan for the Federal Reserve Board. This survey indicates that consumers in general are confident with respect to their probable financial position in the near future and are planning heavy purchases of major durables and housing. Current reports on retail trade suggest no relaxation of demand due to the Korean "peace scare" but indicate rather that buying continues at satisfactory levels, with dealers apparently of the opinion that this situation will continue for some time.

(Turn to page 134, please)

On heaviest equipment--in severest vibration--

PALNUT LOCK NUTS HOLD TIGHT!



PALNUT DOUBLE LOCKING ACTION



1. Locks the NUT
When the PALNUT is tightened, powerful spring tension (A-A) is exerted up-

ened, powerful spring tension (A-A) is exerted upward on the threads and downward on the ordinary nut.

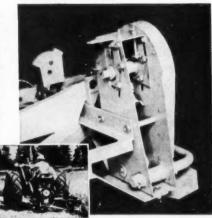


2. Locks the BOLT

At the same time, arched, slotted spring jaws close in and grip the bott like a chuck (B-B).

With their unfailing locking action, PALNUT Lock Nuts offer low cost, easy assembly, space savings and many other advantages over other locking methods. For years, PALNUTS have proved this on automotive and all types of heavy machinery and equipment. Automotive uses include connecting rods, main bearings, engine mountings, body hold down, shock absorber mounting, transmission housing, etc.

MINNEAPOLIS - MOLINE CO. has used PALNUT Lock Nuts for years on its famous line of farm equipment. Illustration shows PAL-NUTS on frame bolts of Minneapolis-Moline Uni-Mower.



Send for Bulletin #577 and free samples.



The PALNUT Company
60 Cordier St., Irvington 11, N. J.
Detroit: 730 West Eight Mile Road

PALNUT LOCK NUTS



The Business Pulse

(Continued from page 133)

Future Commitments

Among retail and wholesale dealers, however, there are signs of greater conservatism in the making of future commitments. This attitude has probably been prompted, in part at least, by the recent weakness in prices, indicating the possibility of substantial inventory losses in the event of further price recession.

Consumer credit continues to be actively discussed, with more and more observers taking part in the debate, but with no evident approach toward agreement. One view is that instalment buying is making possible a rate of production in consumer durables that is not warranted by currently earned consumer income and that this "borrowing from the future" could have serious repercussions later on-serious, at least, if the rise is allowed to go on. The opposing view is that consumer credit, considered as a percentage of disposable income, is no higher now than it was before World War II. The Senate Banking Committee has voted to restore control authority to the Federal Reserve Board, but the latter has given no indication that immediate use would be made of such authority, even if Congress should enact it.

The comparative tightness which. has been evident in the money market since the autumn of 1952 has continued. There has been no abatement in the demand for bank credit, although a seasonal decline is normal in the first half of the year. Reflecting the continued demand for credit and the extreme shortage of bank funds, major institutions in the principal financial centers have raised their prime rate on business loans from 3 to 314 per cent. The Treasury bill rate has risen to the highest level in more than twenty years, and the new Treasury 314 per cent bond has declined below par.

Lockheed to Add Assembly Line

Lockheed Aircraft Corp. will add a 392-ft-long assembly line structure to one of the company's largest manufacturing buildings. To cost \$3 million, it will accommodate parallel assembly lines for Super Constellation military models and Navy P2V patrol bombers. The new structure will locate 240,000 so ft of factory space under one six-story high building. Construction started about Mar. 1 with tentative completion date of mid-February 1954.

"Little compressor exchange cost in many years use on our vehicles equipped

with





Regardless of how many miles their fleets travel, owners will be money ahead if they

take the advice of men like "Pop" Apperley.

Fleet operators who have installed Wagner Air Brakes have proved that they will reduce

costly down time for shop repairs, are easy

to install, and provide reliable, safe-sure

overlapping air compression impulses occur

each minute providing smooth, dependable operation and quiet performance. There's no carbon and sludge formation in air lines either, because the oil is separated and cooled before the air is discharged from the Wagner Rotary Air Compressor. This results in the reduction of air temperature retarding the formation of carbon.

It will pay you to include Wagner Air Brakes as Standard Equipment on the vehicles you manufacture. They give truck

operators added safety and economy. Write

for complete information and request copy

of Wagner Bulletin KU-201A.

The heart of all Wagner Air Brake Systems is the Wagner Rotary Air Compressor ... the compressor that maintains uniform torque load because thousands of small

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says: E. "Pop" Apperley, Superintendent of Maintenance

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Fast Motor Freight

"OVERNITE . EVERY HITE"

Wagner Electric Corporation 6400 Plymouth Avenue St. Louis 14, Missouri

October 9, 1952

Gentlemen:

Our tractor units chalk up a lot of mileage while hauling freight over the mid-west. As superintendent of maintenance for Interstate superintendent or maintenance for interstate Dispatch, Inc., my main responsibility is to make sure all our road vehicles are in perfect condition before they go out. This means our drivers know the trucks they're driving are safe trucks—theroughly checked and in top condition trucks-thoroughly checked and in top condition.

My experience with Wagner Air Brake Systems My experience with Wagner Air Brake Systems has shown that I can rely on the performance dependability of these brake units knowing that they'll provide the needed power to stop our vehicles safely, smoothly at all times. Much of It is quiet in operation, easy to install, provides ample air, and lowers our maintenance costs. In fact, I've found that Interstate Dispatch, Inc., has had little compressor exchange with Wagner Air Brakes.

Very truly yours, 2 apperly

E. APPERLEY Superintendent of Maintenance

EA pw

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K53-5 A

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"Just like a grinding wheel!"





Grinding Wheels

He's right! A grinding wheel's cutting particles are embedded like currants in a bun. But there's more than that to Simonds wheels. The cutting particles are scientifically processed by Simonds. They're accurately sized. They're evenly distributed. Their spacing in the wheel bond is controlled for maximum cutting efficiency on specific grinding jobs. This controlled quality assures you of superior performance each time you order Simonds grinding wheels, mounted wheels, segments or polishing grain. Write for data book and name of your distributor.



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New Products

For additional information please use postage-free reply card on page 73

(Continued from page 72)

Process for Cutting Refractory Materials

Recently developed is the DynArc process for cutting and piercing stone, cement, concrete, and refractory materials. It uses a self-energizing arc rod, known as DynaTrode, which requires no ground and does not have to be struck upon metal.



The heavy coating on the rod, formulated to give the thermo chemical inter-reaction with the arc stream to react with the non-metallic material, is reduced more slowly than the core. This forms a crucible or tube of coating through which the tremendous energy is concentrated into a fine tip, the thermal ionization of the coating by the arc stream combined with the concentration produces the conditions necessary to pierce and melt the refractory material.

It is claimed that the process may be used wherever a d-c welding machine is available of 250- or 400-amp or more capacity, the DynArc process may be used. ChemoTec Div., Eutectic Welding Alloys Corp.

Circle P-9 on page 73 for more data

Crane Hook Sling

Model 52 has been recently added to a line of Adjust-A-Leg equalizing (Turn to page 151, please)

An open letter to potential buyers of special machine tools and special tooling

Now, we can offer you greatly expanded facilities for the solution of your specific metalworking problems

FOR 55 years we've been designing and building special machine tools — as well as tooling and adaptations for standard equipment. But because of limited facilities, we could serve only a minimum number of you as customers in this ever expanding and increasingly important market.

Frankly speaking, we have decided that the time has come when we must be able to serve more of you. To do this job right, we are now completing a \$5,000,000 plant expansion to handle this work — to help you solve your special production problems with special machinery and special tooling, big — or small.

Here are our qualifications:

EXPERIENCE: We've been in the business 55 years. During that time we have designed and built over 60,000 standard and special machine tools. In recent years, our production of special machinery has ranged up to four million dollars annually.

FACILITIES: Our new expansion is devoted exclusively to the production of special machinery. The new plant, built on a site covering 38 acres, is equipped with over \$2,500,000 worth of the very latest tools and equipment — many of them custom-built for the job.

PERSONNEL: Our Special Machinery Division engineering section has at its command nearly 100 experienced, imaginative and practical design and project engineers . . . men fully qualified in the sciences of applied mechanics, hydraulics, electronics and metallurgy . . . and metalworking.

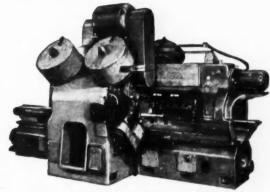
PERFORMANCE: Kearney & Trecker's Special Machinery Division is best recommended by its outstanding record of successfully solving many hundreds of unusual machining problems . . . problems that involved demands for high volume production, as well as exacting dimensional accuracy and fine surface finish.

RESPONSIBILITY: Our Special Machinery Division is an integral part of the Kearney & Trecker Corporation... and is fully supported by all its financial and physical resources. Any commitment for a product of this division is a commitment that fully involves the accepted reputation for responsibility and satisfaction that is Kearney & Trecker's.

We invite your inquiry

We'll be glad to provide you with any information we can . . . including sample machine specification sheets on typical installations, a brochure covering the expanded facilities of our Special Machinery Division, and details on our Customer Engineering Service. Furthermore, if you have special production machinery problems, have one of our senior Project Engineers analyze them, without obligation, of course.

Write, wire or phone the Special Machinery Division, Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.



We've built special machines or adaptations of standard equipment for practically every industry. Here is a photo of a transfer-type milling machine we designed and built for a major automotive manufacturer.



Canada's Aviation Industry

(Continued from page 52)

in the cockpit. Avro engineers are understood to be at work presently redesigning the fuselage to permit installation of an additional rocket compartment slung between the plane's two engines. This may bring rocket capacity to 100.

The CF-100 is a two-seater, allweather fighter designed entirely in Canada. To get it into production required the establishment of numerous parts makers, many of whom came to Canada from the United States and Great Britain, and have set up new factories in the Toronto area. Assembly of the aircraft is now in full swing at the Avro plant at Malton, just outside Toronto.

Close by is the new windowless factory opened last summer for the

production of the Orenda jet engine being built by A. V. Roe Canada, Ltd. When the plant was opened Canada announced an order of \$66 million for these engines, to power the CF-100 as well as the F-86E Sabre being made at Montreal. Production of the Orenda engine is not officially available, but it was announced at Ottawa in mid-February that to end of 1952 a total of 96 Orenda engines had been built. Ottawa also stated that some \$15 million had been spent on tooling up for the Orenda production, and that \$38 million had been spent on production. Factories to make special alloys and components for the engines have been built in the Toronto area by British and United States firms in the past two years. Some 400 companies supply A. V. Roe Canada, Ltd., for both aircraft and engine production. Avro has about 14,000 employes in both plants.

Ottawa over the past four years has spent over \$30 million on development of several types of Orenda engines, for CF-100 Mark IV and F-86 Sabre Series 10, it was stated in Parliament in mid-February.

In addition to the CF-100 and Orenda, the Avro plant has designed and produced two prototypes of the CF-102 Jet Transport, a commercial or military 50 passenger transport with four jet engines. Production on this has been held up to give priority to the fighter aircraft, but the jet transport still is undergoing tests in Canada and the United States. Avro is also understood to have designed a swept-wing fighter, CF-103, at a cost of \$1,116,000 and \$85,000 for engine. This has been abandoned for the present on Ottawa's instructions. Currently experimentation by government and Avro researchers is being done on a gyroscopic type of fighter with speeds of 1500 miles per hour, according to various reliable reports from Ottawa and Toronto. Officially this is stated to be still in the very experimental stage, on the theory of designing a fighter which will rise almost vertically, then go at supersonic speeds. Unofficial reports are that the plane will have a revolving series of jet engines about a pilot's compartment.

Elsewhere at Toronto, De Havilland Aircraft of Canada Ltd., partly owned by the parent company in Great Britain, has designed and is producing a number of single engined aircraft. One is the Chipmunk basic trainer, which is in small production in Canada but in major production in Great Britain. It has been built in Canada



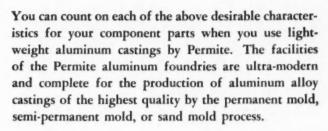


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Our engineers work closely with manufacturers as desired on design and alloy problems, so that full advantage of light-weight aluminum may be gained in meeting their specific parts requirements.

For facts on which to judge the advisability of changing to light-weight Permite aluminum castings, send blueprints and specifications for recommendations and cost estimates.

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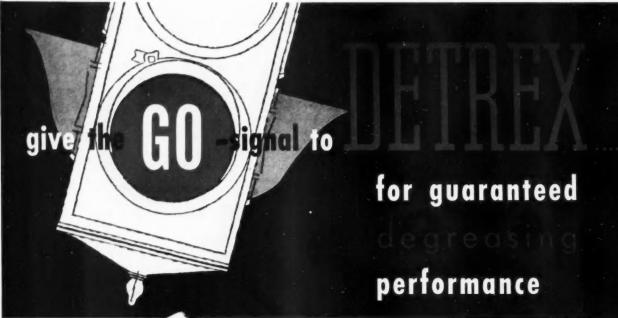
Detroit: 809 New Center Building

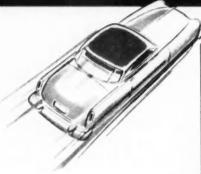
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When you give the go-signal to Detrex, a skilled, well-coordinated team goes into high gear on your degreasing needs. One of our trained field staff surveys your operations, makes on-the-spot tests and demonstrations, and takes into consideration every factor that plays a part in overall degreasing efficiency. With this information, Detrex chemists and technicians from our laboratories join efforts with our equipment engineers to determine the type of degreasing operation best suited for your needs. Then, final recommendations are submitted to you along with actual performance data for the operation. The results are guaranteed!

Detrex guarantees results because only Detrex has complete control of the process from start to finish. Detrex is the world's leading manufacturer of degreasers—industry's largest direct supplier of trichlorethylene degreasing solvent. Detrex is the only company that produces both.

But Detrex service does not stop with delivery on your order. The Detrex Field Service Engineer visits your degreasing operation regularly to make sure it continues at maximum efficiency and economy. He will point out ways to conserve solvent and increase production. Detrex assists in the training of operators and supervisors. In effect, they become skilled advisors on your staff without fee. There is absolutely no charge for the service . . . it comes automatically to Detrex customers.

Give the go-signal to Detrex on your degreasing operations. It will save you money, assure results.

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chemicals



With large, modern trichlorethylene producing plants in Ashtabula, Ohio and Tacoma, Washington, Detrex is industry's largest direct supplier of degreasing solvent. Through a network of field stocks, Detrex distributes this solvent to industry in the most convenient and economical manner. Deliveries are made to customers upon orders direct to the nearest stock point. By the drum, by tank car, Detrex meets your solvent requirements with premium-grade Perm-A-Clor at regular prices. Detrex also provides perchlorethylene and other solvents when required for cleaning or other operations.

equipment

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field service



Deliver inclination is mailtonyride stuff of instead appellation for contensor ervice. Their childs and their time are at the disposed of Deliver automore without thereon. They make appelled degreening speculiars and point up evolve to imposite a complete and point up evolve to imposite a speculiar and point up evolve to imposite a speculiar and population of a disposed on the annual formation of a factor and propositions of a factor and propositions of a factor and propositions of a factor and production made to determine their delivers of their adversaries (their adversaries of their adversaries are actions. The installed of their affects are actions of a completion of exceptions.

research



Research is the keystone of Detrex product development. In fact it was Detrex research that developed the means to stabilize chlorinated solvents and thus made modern solvent degreasing practical. Today, extensive Detrex laboratory facilities are manned by competent specialists. The revolutionary new ultrasonic process of metal cleaning, "Soniclean", is just one example of Detrex continuing research, Detrex research objectives are two-fold; 1) to develop new and better chemicals and processes in pace with the changing needs of industry and, 2) to constantly search for ways to make present Detrex products serve you more efficiently and economically.



Farquhar Hydraulic Press at the Weirton Steel Co.

"eliminates breakage of rods...increases production 100%"

The Weirton Steel Co., Weirton, W. Va., formerly straightened stopper rods with a steam hammer. The operation was slow and resulted in a high percentage of breakage. Seeking a better method, Weirton officials bought a Farquhar Press to speed production. Not only has the press increased production 100%, but it has eliminated breakage of rods. In haddition, Weirton reports that in the six years this press has been operating, "practically no maintenance has been necessary."

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in modern production! Farquhar Presses are built for the job... assure faster production due to rapid advance and return of the ram... greater accuracy because of the extra guides on the moving platen... easy, smooth operation with finger-tip controls... longer life due to positive control of speed and pressure on the die... long, dependable service with minimum maintenance cost.

Farquhar engineers are ready to help solve whatever production problem you may have. Send for free catalog showing Farquhar Built-for-the-Job Presses in all sizes and capacities. Write to THE OLIVER CORPORATION, A. B. Farquhar Division, Hydraulic Press Dept., 1523 Duke St., York, Pennsylvania.



Canada's Aviation Industry

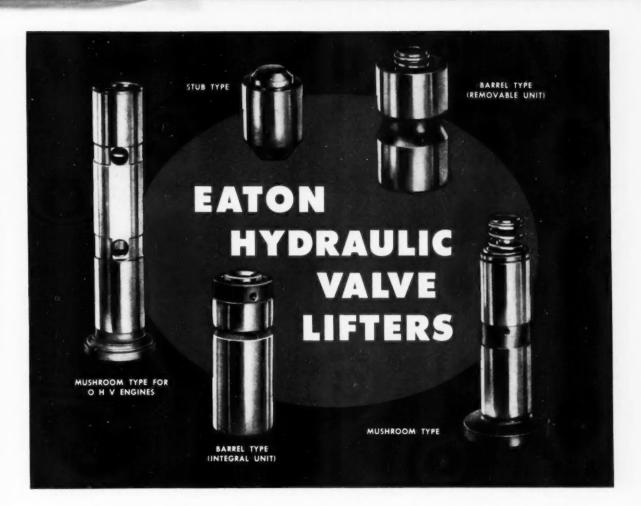
(Continued from page 138)

for a number of foreign governments for military training. De Havilland at Toronto has also designed and is producing the Beaver and Otter transports for Canadian, United States and South American operations. The Otter is an enlarged version of the Beaver, a single-engined, six-place utility plane designed for use in Canada's northland for quick take-off with heavy loads from small lakes and small landing strips. The Beaver is being used by the United States military forces in Korea as the L-20A for ambulance and reconnaissance operations. Of 232 Beaver aircraft made last year, most were for the United States Government.

At Montreal the major operation is production of F-86E Sabre jet fighters, some 200 of which have now been produced by latest official figures by Canadair Ltd., subsidiary of General Dynamics Inc., New York, which bought the aircraft plant from the Canadian government after World War II. Production of the Sabre jet fighter took about two years to get underway, now is up to about 40 a month. The planes are being ferried to Europe as fast as they come off the production line for both the Royal Air Force and the squadrons of the Royal Canadian Air Force stationed in England and France. Production for Great Britain is part of Canada's NATO agreement and will total about 400 aircraft. Some 50 of the Canadian-built aircraft were shipped to the United States air forces in Korea to meet a shortage there some time ago.

In addition to the Sabre, the Canadair Ltd. plant is also producing the Lockheed T-33 jet trainer, over 500 of which have been ordered for the RCAF by Ottawa. First of the trainers was accepted for the Canadian government in mid-February. Production is to start soon on the twinengined Beechcraft T-36 advanced crew trainer, primarily for the United States Government. A prototype is now undergoing tests.

Canadair Ltd. began its postwar operations with Canadian modifications of the Douglas DC-4 for Canadian airlines and the RCAF. The company is working on a new version of the DC-3 and may build under license the new British Bristol Britannia, 100 passenger transport. Canadair Ltd. employs about 12,000 peo-



Available in ALL Types to Meet the Requirements of ALL Engines



As a pioneer in the hydraulic valve lifter field, and the major producer of hydraulic lifters for 25 years, Eaton is equipped by both experience and production facilities to meet the particular requirements of each engine. Eaton Hydraulic Valve Lifters are available in all types and in all materials, including heat-treated steel, hardenable iron, chilled face, and puddled face types.

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EATON PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



Filling the gap in industrial hydraulic drives, Twin Disc offers the first of a new series of Two-Stage Hydraulic Torque Converters - providing maximum operational efficiency, up. to 4:1 torque multiplication at stall combined with progress. sively increasing engine speed during acceleration or uniform pull-down under load. This new series features complete unloading of the engine at high-speed, no-load conditions, providing economy and minimum cooling requirements. This new concept in Two-Stage Converters developed in close cooperation with leading engine and equipment manufacturers - is backed by the

same engineering and service reputation that has already made Twin Disc the acknowledged world leader in the development of Industrial Three-Stage Hydraulic Torque Converters.

If you are using powered equipment needing a Torque Converter Drive— and for which the modified performance characteristics indicated are desirable—write for specific information on the new Two-Stage Torque Converter Series.

Address all inquiries to Twin Disc Hydraulic Division, Rocking ford, Illinois.

Typical Twin Disc Two-Stage Hydraulic Torque Converter, Model SD (shown above), with Spider Drive and Disconnecting feature.

Built for a Long Life . . . Backed for a Lifetime





TWIN DISC CLUTCH COMPANY, Racine, Wisconsin . HYDRAULIC DIVISION, Rockford, Illinois

BRANCHES: CLEVELAND . DALLAS . DETROIT . LOS ANGELES . MEMARE . MEM ORLEAMS . SEATTLE . TULSA

ple, will have 16,000 this summer.

In Montreal three engine companies have started operations. Rolls Royce Canada Ltd. is to make in its new factory 900 Nene jet engines for the T-33 jet trainer. The order for these is about \$33 million. This is a British-designed engine, with most components being made in Great Britain. About 300 men will be employed.

Canadian Pratt & Whitney Aircraft Co. Ltd. is building the R-1340 American-designed for use in Harvard trainers being produced at Fort William, Ont. Production capacity of 300 engines a month is in a new plant near Montreal, employing about 1500 workers.

Bristol Aeroplane Co. of Canada has a new plant at Montreal, in addition to an overhaul plant at Vancouver. Both do service for the Bristol engines used by the RCAF and the aircraft of the Royal Canadian Navy. Bristol may build Wright engines in Canada for commercial transports.

At Toronto, a new Canadian General Electric overhaul plant for servicing the United States J-47 jet engines on the F-86E Sabre aircraft, was opened last summer.

At Fort William, Ont., Canadian Car & Foundry Ltd. is making World War II Harvard trainers, a \$36 million order for 1000 of these keeping almost 1800 people employed at the plant where numerous World War II planes were made.

These are the principal aircraft and engine plants in Canada. Some smaller facilities are in operation on contracts and sub-contracts at Winnipeg and Edmonton.

In the fiscal year 1953-54, starting April 1, the Canadian government is spending about \$420 million on jet aircraft, double the amount spent in the fiscal year 1952-53.

BOOKS ...

AVIATION ALBUM, by Edward L. Throm and James S. Cranshaw, published by Popular Mec, anics Press, 200 E. Ontario St., Chicago, Ill. Price \$3.00. In this special volume commemorating the golden anniversary of the first flight of the Wright brothers at Kitty Hawk, is the complete story of aviation. It begins with the efforts of ancient peoples to "fly like the birds," and it ends with contemporary man, now able to fly faster than sound and poised for further adventure in outer space. Here is traced the role of the airplane in peace and in war—the growth of commercial aviation from circus and fair-ground stunt flying, and the part played by military aircraft in both world wars and in the Korean conflict of our time.

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Supplier of Inner Coil Spring Units to Mattress and Furniture Manufacturers.



Supplier of Racks and Shelves to the Refrigerator and Stove Manufacturers.



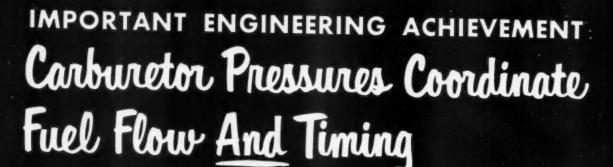
Supplier of Interior Metal Trims and Spring Seating Units to the Automotive Industry.



Supplier of "Star Service" All Wire and "Paper-Strut" Garment Hangers to Cleaners and Dyers.







WHERE HOLLEY CARBURETORS
ARE USED WITH HOLLEY DISTRIBUTORS



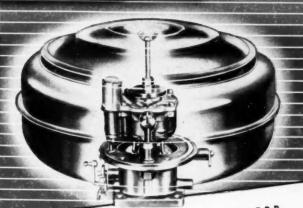
CENTRI-QUAD CARBURETOR

Designed to add horsepower to present day engines, the Holley Centri-Quad is the only carburetor to combine four barrels into one carburetor with one float assembly. The concentric design prevents loading or starving during sharp turns and fast stops and starts. The Centri-Quad is designed for the same basic aircleaner installation as used on the Centri-Flo. Calibrated for engines of 150 to 225 horsepower.

WITH

HEAVY DUTY PRESSURE DISTRIBUTOR

Designed for installation on maximum horsepower engines, the heavy duty pressure distributor meters spark in exact relation to power requirements and fuel flow because it operates from pressures which exist within the carburetor.



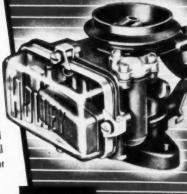
CENTRI-FLO CARBURETOR

This true concentric carburetor is designed with all important metering parts at the center line of the fuel bowl. The Centri-Flo assures smooth, uninterrupted engine performance during fast stops and starts and sharp turns. The unique carburetor and air-cleaner combination allows lower hood lines-meets the modern styling trends. Calibrated for engines of 110 to 180 horsepower.

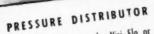
OR

VISI-FLO CARBURETOR

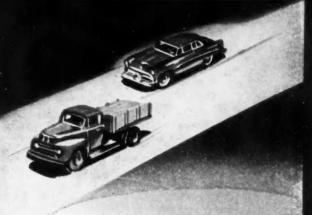
The clear glass fuel bowl and the replaceable metering unit features of the Visi - Fla have revolutionized carburetor service. This compact carburetor -only four inches high - can be used where limited overhead space ordinarily requires special manifold design. Calibrated for 80 to 120 horsepower.



WITH



Combined with either the Visi-Flo or Centri-Flo carburetor, the Holley pressure distributor provides quicker, smoother performance and greater fuel economy. Holley pressure distributors are the only distributors now available that eliminate the need for a centrifugal advance mechanism.



Combining fuel and ignition controls is one of the newest "new thoughts" originated by Holley to increase standard of engine efficiency and performance. Each of the carburetors shown on these pages is designed to provide the best performance when used with a Holley pressure distributor.

These original equipment products have been adopted by some of the most famous names in the passenger car and truck fields. There is a combination available for nearly every horsepower rating now used in the automotive industry.

ARE YOU WONDERING . . .



How to do a good job of fuel metering better? Let Holley engineers listen, test, design, and recommend.



FOR MORE THAN HALF A CENTURY ORIGINAL EQUIPMENT MANUFACTURERS FOR THE AUTOMOTIVE INDUSTRY

Comments on Piston Pin Offset

To the Editor:

Mr. P. M. Heldt in his article on the Effects of Piston Pin Offset (AUTOMOTIVE INDUSTRIES, March 1, 1953), is correct in stating very little has been published on this subject, and also on the optimum location of the piston pin in relation to the top and bottom of the piston skirt.

Many years ago, it was considered

good design to locate the piston pin squarely in the center of the skirt to produce even wear on the piston skirt. Pistons so designed did not wear appreciably more uniformly than those with the pin located nearer the piston rings. The tendency toward shorter pistons, more compact cylinder blocks, and pistons of less weight has gradually raised the piston pin higher and higher until I expect to open AUTOMOTIVE INDUSTRIES someday and see a description of a new engine with the piston pin deftly concealed behind the piston rings.

Mr. H. H. Brambery did a lot of work on this subject about twenty years ago, but unfortunately I do not believe the results of his work appeared in the Journal. Like a lot of the rest of us, he was keenly conscious of the fact that this rocking of the piston was responsible for the rounding over of the face of the piston rings and the resultant increase in oil consumption.

He discovered a number of unsuspected factors influencing the rocking action of the piston, such as the relative weights of those portions of the piston above and below the horizontal center line of the piston. He also found that unlike the tests of Dipl. Ing. A. Meyers, who used needle bearings, that one could not neglect the very high friction factors present in the piston pin bearing surfaces just as the piston pin passed through top and bottom dead centers.

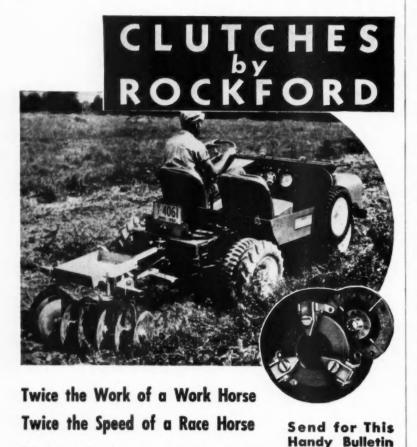
The advent of pistons with a steel ring cast in the skirt to control the expansion permits fitting pistons with far less clearance and reduces the ill effects of rocking. The importance of this closer fitting becomes clear when it has been demonstrated that engines in oil field service, operating around the clock with a high load factor, but with pistons at a high temperature and thus with minimum clearance, will operate 8000 to 10,000 hours, not miles, before their first overhaul period.

Conditions are far less favorable with pleasure car engines with light loads, frequent starts and pistons operating with their maximum clearance in the majority of cases. Here, as Mr. Heldt points out, there is room for considerable work to determine the desirable amount of piston pin offset and any other factors that will reduce the rocking action.

One approach, applicable on test engines only, would be to leave narrow bearing lands near the top and bottom of the skirt and test pistons with different amounts of pin offset for a standard test period and measure the amount of land wear, which would give an indication of the rocking action and resultant pressures at the top and bottom of the piston skirt. The lower land would not be allowed to leave the cylinder bore at lower bottom dead center. One could thus determine the desirable amount of offset that could be used without undue skirt wear to reduce piston slap.

Sincerely yours,

J. B. Fisher, Consultant, Waukesha, Wis.



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TAKE-OFFS. Contains diagrams of unique applications. Furnishes

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The Crosley FarmOroad "goes to town" plowing,

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other farm jobs - then carries the family and

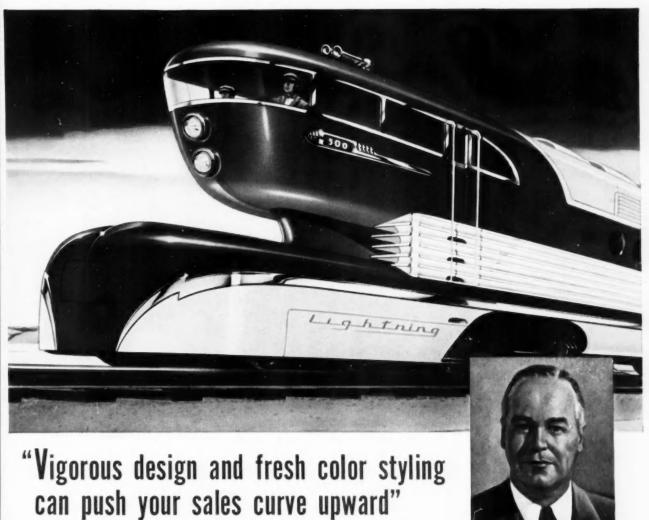
produce to town quickly, comfortably and econo-

mically. ROCKFORD CLUTCHES contribute to the

sturdy dependability of this versatile unit. Let

ROCKFORD clutch engineers help with your power

transmission control problems.



. . . says George Walker, Detroit industrial designer



Push your sales curve upward with the help of a planned design and color styling program! Industrial designers and automotive or industrial color stylists are cordially invited to make the most of color by availing themselves of the consulting services of the Rinshed-Mason color styling section. Ask us for a comprehensive study of the technical, esthetic and psychological aspects of color applied to your product!

"IDEAS of speed, power and comfort are dramatically portrayed in this visionary diesel locomotive through the application of vigorous design and fresh color styling," says George Walker, Detroit industrial designer. "We have displayed our diesel design here to emphasize the idea that design and color are two top-notch salesmen!

"Most of us have heard the expression, 'It sells on sight.' Your product can sell on sight with the help of vigorous design and fresh color styling: two hard-hitting salesmen! Apply them to your product and watch your sales curve rise!"

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Designing and producing fifty-three million radiators over a period of fortytwo years is an impressive achievement.

The knowledge gained from long experience, plus modern research and testing facilities, makes Harrison eminently qualified to take care of any automotive cooling requirement.

Radiators—millions of them each year—don't just happen at Harrison... they are engineered to do specific jobs and to do those jobs right.

H A R R I S O N

GENERAL MOTORS CORPORATION



New Products

For additional information please use postage-free reply card on page 73

(Continued from page 136)

slings for use on crane hooks. It offers a more complete range of nine sizes, from % to 28-ton capacities. An important feature is said to be a locking device which enables the wire rope legs to be frictionally locked in place. The only moving part is a springmounted roller in the V-groove providing free movement for leg adjustments. The Caldwell Co.

Circle P-10 on page 73 for more data

Iron Powder Metal

Developed is an iron powder metal that is said to have improved ability to withstand high stresses without cracking. Known as Steel Oilite, it reportedly has physical properties that are comparable to mild carbon steel, such as SAE 1010, 1020, or 1030.



It is claimed that the metal withstands pressures of up to 70,000 psi. Moreover, it is not brittle and may be bent or twisted without breaking.

The product can be used for finished machine parts, such as gears, cams, brackets and lever arms. It is not meant for self-lubricating applications.

Steel Oilite can be plated by any of the normal processes. It may also be hardened by direct quenching or carburized and hardened. Amplex Div., Chrysler Corp.

Circle P-11 on page 73 for more data

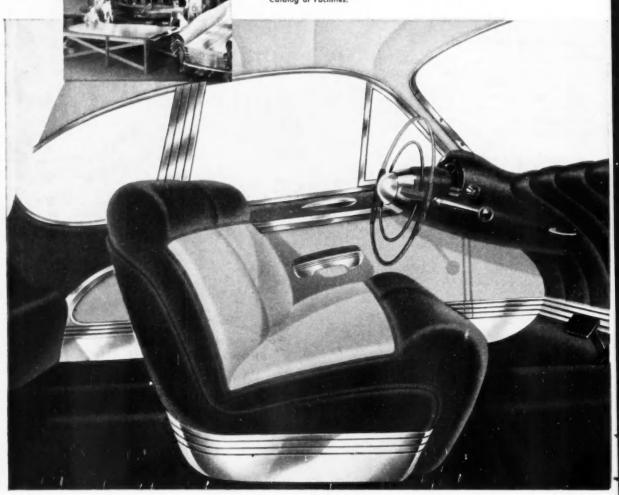
Weldable Alloys

Two alloys, said to be particularly suited for use in welded assemblies (Turn to page 154, please) See how QUALITY FOREMOST MFR'S, OF FINE ALUMINUM CASTINGS is controlled to help you at the foundry level of production **NEW BROCHURE** SHOWS HOW PERMOLD KEEPS "UNDER CONTROL" Ask for your copy—a pictorial description that shows how continuous, scientific control of Permold aluminum casting quality, to specifications, saves you time and money. Please send new brochure, "Quality Control Under Control," describing modern casting methods and facilities at PERMOLD. Name Position_ Company. **820 West Liberty Street** Medine, Ohio

Plan on ALUMINUM

and Plan on

Over 30 Reynolds plants in 1B states assure a steady flow of parts to the automotive industry. Two of these plants alone have over 200 major pieces of production equipment including 128 presses—mechanical from 2 to 1700 tons and hydraulic from 300 to 5000 tons. Photo shows 1700 ton Reynolds Press and one of the largest drawn aluminum parts ever made-a one-piece 12' by 4'8" hull for an aluminum boat. Write for your copy of Reynolds 24-page "Catalog of Facilities."



REYNOLDS ALUMINU

BLANKING . EMBOSSING . STAMPING .

REYNOLDS

for

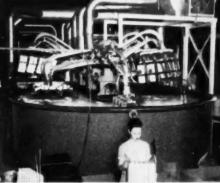
Automotive Parts and Trim

On the road and on the drawing board, you see more and more applications of aluminum in automobiles, because aluminum offers a unique combination of savings and efficiencies not possible with other materials. To make the most of these advantages in your automotive parts and trim, call on Reynolds Aluminum Fabricating Service. Here, top production facilities, design and engineering service plus quality control from mine to finished product are available to help reduce your costs and improve your products.

For full details, contact your Reynolds office listed under "Aluminum" in your classified telephone directory or write Reynolds Aluminum Fabricating Service, 2087 South Ninth Street, Louisville 1, Kentucky.



Completed parts, like these extruded aluminum automabile window frames produced by Reynolds, cut assembly, handling and other costs for automative manufacturers—often materially reduce tooling and over-all costs of other parts.



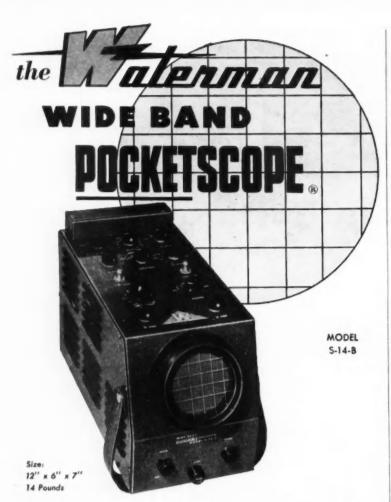
Reynolds automatic anodizing equipment assures efficient mass-production of parts and trim to your specifications. Anodized aluminum parts won't rust, are more economical than most plated parts and offer attractiveness without high glare.

Be sure to see "Mister Peepers" every Sunday night, 7:30 EST, NBC-TV; hear "Fibber McGee and Molly" every Tuesday night, 9:30 EST & PST, NBC

FABRICATING SERVICE



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ANOTHER EXAMPLE OF Talerman PIONEERING ...

The WIDE BAND POCKETSCOPE, model S-14-B, hits a new high in frequency response for light, compact, truly portable oscilloscopes. The response extends all the way from DC to 700 KC within —2 db without peaking. Thus providing a pulse rise time of 1.8 microseconds. Furthermore, sensitivity has not been unduly compromised in order to accomplish such fidelity. The vertical sensitivity is 50 millivolts rms/inch. The sweep is operated in either a repetitive or trigger mode and covers a range from 0.5 cycles to 50 KC with synchronization polarity optional. Other essential vertical and horizontal amplifier characteristics

include non-frequency discriminating attenuators and gain controls as well as individual calibration voltages. Additional provisions for direct access to all the deflection plates, the second anode, and the amplifier outputs help to make the S-14-B a standout instrument of flexibility and utility. All this plus portability! The incredibly small size and light weight of the S-14-B now permits "onthe-spot" use of the oscilloscope in all industrial, medical, and communications fields. Its rugged construction assures "laboratory performance" regardless of environment.

WATERMAN PRODUCTS CO., INC. PHILADELPHIA 25, PA. WATERMAN PRODUCTS INCLUDE CABLE ADDRESS: POKETSCOPE S-4-A SAR PULSESCOPE® MEMO S-5-A LAB PULSESCOPE S-11-A INDUSTRIAL POCKETSCOPE S-12-B JANIzed RAKSCOPE S-14-A HIGH GAIN POCKETSCOPE S-15-A TWIN TUBE POCKETSCOPE Also RAYONIC® Cathode Ray Tubes and Other **Associated Equipment** VATERMAN PRODUCT

New Products

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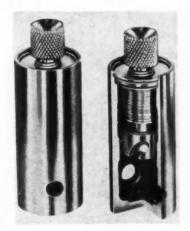
(Continued from page 151)

such as pressure vessels, tanks, and highway equipment, have been placed on the market. Designated XA54S and XC56S, they reportedly permit the use of thinner section thicknesses. Aluminum Co. of America.

Circle P-12 on page 73 for more data

Self-Adjusting Tappets for Good Valve Timing

Perfect valve timing at all times, valve hammer or burning minimized, greater engine efficiency, power, and speed are advantages claimed for a line of self-adjusting tappets.



The tappets are said to feature an internal tension control that automatically adjusts at every piston stroke to variations in the length of the valve mechanism system. Thus, the tappets compensate for expansion and lengthening of the entire valve system at high engine heat, and for contraction and shortening when cold.

The units are reported to be easy to install, and are said to maintain proper valve timing for a long life.

It is claimed that they can be installed in engines whether or not they are designed for automotive tappets. They can also be run at zero lash, or any pre-determined lash which is set at the factory. Skinner-Moser Sales.

Circle P-13 on page 73 for more data (Turn to page 156, please) Here's a production idea that cuts costs...improves products... Thomas pre-coated strip



Thomas Cold Rolled Pre-coated Strip steel is more than a quality product—it's a production idea that helps reduce costs-speeds operations and makes a better finished product.

Take Thomas electro-plated copper strip for example. It serves as a die lubricant and stretches die life, protects parts in process against rust, is used as a low-cost final finish for many products and increases efficiency of tinning, soldering and brazing operations. In many instances entire operations such as raw material preparation, intermediate cleaning, buffing and final plating all may be eliminated.

Profits and production start quicker, get there faster when you include Thomas Precoated Strip steel in your plans to produce better products. To learn how you can enjoy these advantages write today for information.

Cold-rolled strip steel electrolytically pre-coated with Zinc, Copper, Brass, Nickel and Lead-Alloy in Natural, Planished and Buffed Finishes-Hot Dip Tin and Lead-Alloy Coated-Lacquer Coated in Colors—Annealed Spring Steel—Alloy Strip Steel-Uncoated Strip Steel. Carefully produced to your specifications.



Pittsburgh Steel Company

Thomas Strip Division • Warren, Ohio

New Products

For additional information please use postage-free reply card on page 73

(Continued from page 154)

High-Lustre Metal

Light weight metal parts with a permanently lustrous high finish are said to be made possible by a new

unusually high finish is a patented method of producing aluminum that is 99.99 per cent pure.

> The metal is alloyed with varying percentages of magnesium for different applications. It is reportedly a work-hardening alloy, easy to fabricate, and may be anodized and dyed in any color.

> Lurium is available in commercial quantities of raw mill forms in all standard shapes, sheet, coils, strips, bars, tubes, wide and extrusions, in soft, half-hard, and hard tempers. Fromson Orban Co., Inc.

Circle P-14 on page 73 for more data

Front Axle for Cars

Now on the market is an automobile front axle which is said to eliminate the conventional kingpin-andspindle mounting. Each front wheel is said to be positioned on a centerline directly around an axle which is ball-mounted in nylon sockets.

It is claimed that the mounting enables both front wheels to turn in circles of equal radii. Road shock is directed through the springs and away from the steering mechanism.



The following advantages are claimed for the axle: constant positive steering control; maximum steering ease; reduced tendency to skid; increased tire mileage; and reduction of front wheel alignment cost and trouble. Ball Axle Corp.

Circle P-15 on page 73 for more data

Free-Machining Steel

Recently developed to serve the screw machine industry is Series 1200 free-machining open hearth steel. Three separate steel analyses comprise the series.

The manufacturer states that the chemical composition is such that there is enough carbon for just the right degree of hardness and brittleness. A little more than the usual amount of manganese provides strength for the steel without toughening it. Jones & Laughlin Steel Corp.

Circle P-16 on page 73 for more data

Flexible Hose

Three new and improved types of Flexaust flexible hose are now available. A new double-overlap construction is reported to make many additional uses possible in the handling of air, gases or materials by pressure, suction, or gravity flow. American Ventilating Hose Co.

Circle P-17 on page 73 for more data (Turn to page 160, please)

Test Cabinet

for SALT FOG CORROSION TESTS or HUMIDITY CORROSION TESTS

for Salt Fog Tests Meets the latest specifications of government and military authorities.

for Humidity Tests 95% to 100% relative humidity at room temperature to 125° F., temperature thermostatically controlled.

features

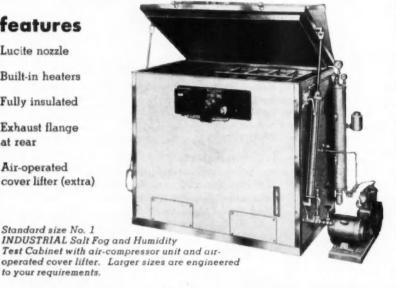
Lucite nozzle

Built-in heaters

Fully insulated

Exhaust flange at rear

Air-operated cover lifter (extra)



Write for complete information and recommendations

PUMPS CORROSION TESTING APPARATUS Pressure Type Centrifugal Saft Fog . Humidity

INDUSTRIAL FILTER & PUMP MFG. CO.

5920 Ogden Avenu Chicago 50, Illinois

RUBBER DIVISION **Vulcanized Linings** • Molded Products DEMINERALIZERS

Specify



Impact Resistance with **Excellent Cold · Formability**

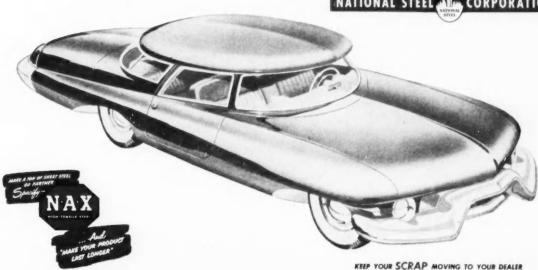
N-A-X HIGH-TENSILE, having 50% greater strength than mild carbon steel, permits the use of thinner sections—resulting in lighter weight of products. It is a low-alloy steel-possessing much greater resistance to corrosion than mild carbon steel, with either painted or unpainted surfaces. Combined with this characteristic, it has high fatigue and toughness values at normal and sub-zero temperatures and the abrasion resistance of a medium high carbon steel-resulting in longer life of products.

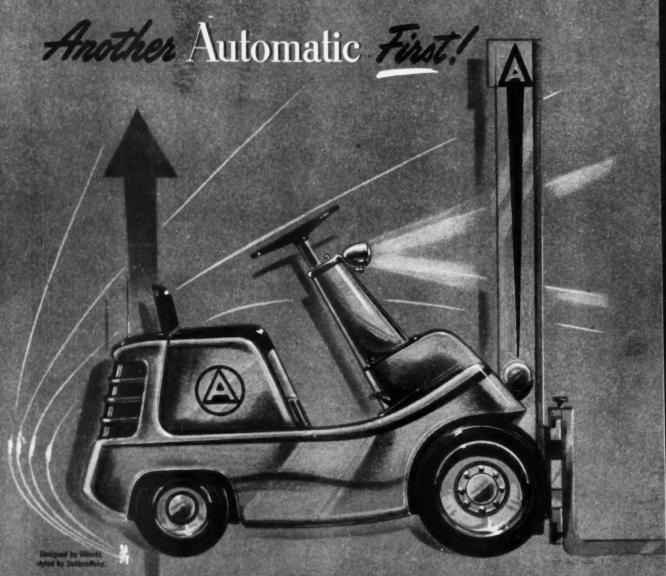
N-A-X HIGH-TENSILE, with its higher physical properties, can be readily formed into the most difficult stamped shapes, and its response to welding, by any method, is excellent. Due to its inherently fine grain and higher hardness, it can be ground and polished to a high degree of lustre at lower · cost than can mild carbon steel.

Your product can be made <u>lighter in weight</u> . . . to <u>last longer</u> . . and in some cases be manufactured more economically, when made of N-A-X HIGH-TENSILE steel.

GREAT LAKES STEEL CORPORATION

N-A-X Alloy Division Ecorse, Detroit 29, Mich. NATIONAL STEEL CORPORATION





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No gears to shift • No clutch to manipulate • No engine shock due to clutching • No hydraulic torque converter • No over-drive mechanism • No mechanical connection from engine to drive unit • Maximum comfort and ease of operation for driver • Foot operated lift and tilt • Interlocked dual brake system for maximum safety • Electric truck teliability • Infinite acceleration range with minimum power loss • Engine speed automatically adjusts to load requirement • Minimum engine wear—maximum life • Less fuel consumption • All advantages of torque converters and overdrive without mechanical devices • Minimum down time • Maximum accessibility • No aisle projections.

Plus these Automatic Industry-proved features:

Silicone insulation for drive motor and generator • Heavy section rolled manganese alloy steel uprights • Ball bearing mounted carriage and upright rollers • Hydraulic safety fuses (with duo lift).

AMERICA'S FIRST GAS TRUCK WITH ELECTRIC TRANSMISSION

The new Automatic

DYNAMOTIVE

Entirely new sections design produces
America's first and only Gas Fork Lift
Truck with Section Transmission No clutch!
No gears to shift! No hydraulic torque
converter or over-drive mechanism.

This new Dynamotive Gas Truck does for users of materials handling equipment what modern diesel-electric power has done for American Railroads. Its electric, infinite step transmission has no mechanical connections... transmits no "clutch shock" to engine... but brings to your materials handling jobs that fully controlled smooth flow of power which insures maximum economy and efficiency.

Automatic

WORLD'S LARGEST EXCLUSIVE BUILDER OF ELECTRIC DRIVEN INDUSTRIAL TRUCKS



PLANNING and engineering fire protection—especially for those key hazards where fire can hit like lightning and with crippling effect—is a job for experienced specialists only. Knowing "who says so" and his qualifications may save you from huge loss.

Fire protection by low pressure carbon dioxide is no exception. And here CARDOX' experience is literally years ahead!

With thousands of installations, plus years of creative research concentrated by war and high priority projects—CARDOX' knowledge in the engineering and manufacture of low pressure carbon dioxide fire extinguishing systems is unparalleled. Protecting many of the world's toughest hazards, CARDOX Systems* have saved industry from uncountable losses in dollars and production.

A survey of your hazards by CARDOX puts this experience at your service. It can be of great value to you—and it costs you nothing. Why not write for a CARDOX survey now?

*Covered by Patents, Issued and Pending.



FIRE EXTINGUISHING SYSTEM:

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS
Offices in Principal Cities

New Products

For additional information please use postage-free reply card on page 73

(Continued from page 156)

Improved Valve Refacer

Recently announced is a valve refacer that is said to incorporate many important improvements, including an end grinding attachment for valve stems, tappets, and rocker arms. It features a Quick-Clamp stem or tappet in place in seconds.



Second, a new coolant system, features wet grinding at both wheels, an easy one-valve control, and an improved coolant reservoir.

Third, more flexible capacity is obtained with valve heads up to four inches; valve stems up to 11/16 inches; valve angles zero to 90 deg, and traverse grinds at all angles.

Other features are: ample power from two universal motors; smooth-grinding hypoid gears; super-speed feed screws; simplified controls; and four-point bearing mountings. The Black & Decker Mfg. Co.

Circle P-18 on page 73 for more data

BOOKS ...

HIGH-SPEED DIESEL ENGINES, by P. M. Heldt, Published by P. M. Heldt, Nyack 9, N. Y. Price, \$7.00. This well-known reference book in the Diesel field has been completely revised in a seventh edition now available. One innovation of particular interest is a pair of tables of crank arrangements for two-stroke engines, with expressions for any unbalanced forces and couples for the different arrangements. Second, there is a discussion of the problem of the effect of atmospheric variables (pressure, temperature, and humidity) on the output and fuel economy of the Diesel. Third, the chapter on railroad engines includes descriptions of some new locomotive engines, both domestic and foreign. A number of new illustrations will be found throughout the text.



NEW
MURCHEY
4 IN 1
SELF-OPENING
DIE HEAD

The new Murchey Self-opening Die Head is a versatile tool.

- Cuts machine screw threads—
 3/32" to 6"
- Cuts pipe threads with a receding action—1/8" to 5"
- 3 Used as a rotating tool on automatic screw machines or drill presses
- 4 Used as a stationary tool on turret lathes and hand screw machines

Fifteen sizes available

Write for Murchey Catalog MU-153

MURCHEY DIVISION
OF THE

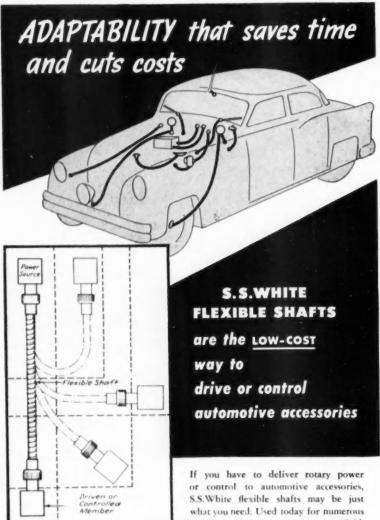
SHEFFIELD CORPORATION

DAYTON 1, OHIO, U.S.A.

6121

AUTOMOTIVE INDUSTRIES, May 15, 1953

161



applications in the automotive field, they make possible big savings in labor, assembly, and parts.

NEW YORK 16, N. Y.

For instance, one flexible shaft can replace a complicated system of belts, pulleys, gears, etc. No accessory is too remote to drive or control effectively, since a flexible shaft can be run to any point-under, over, or around al! obstacles. It's a single, self-contained unit and can be installed with a minimum

It will pay you to investigate the economies of using these adaptable S.S.White "Metal Muscles" ® not only on existing installations but also on products still in the design stage. Our engineers will be glad to cooperate with you. No obligation, of course.

Flexible Shaft Facts! This 256 page handbook covers just about everything you need to know on flexible shaft selection and application. It's yours-free-if requested on your busi-



Western District Office . Times Building, Long Beach, California

K-F Absorbs Willys as New Subsidiary

(Continued from page 19)

Willys vice-president; Leland Lord; Henry J. Kaiser; E. E. Trefethen. Jr.; Walston Brown; Alan E. Schwartz; Sheldon Coons; T. V. Houser, and Webb Wilson, all executives in various Kaiser enterprises.

At least for the time being, the two companies will operate pretty much intact as they have been continuing to produce their individual products and marketing them through their established dealer organizations. No plans for integration have yet been announced but it is likely that in the future, coordination of the facilities of the two companies and perhaps their products will be worked out.

When the transaction is fully carried out, K-F and its subsidiaries will have pro forma consolidated assets of about \$200 million, consolidated net current assets of around \$60 million, and working capital of approximately \$41 million. It will thus be the largest independent automotive company in point of assets and production facilities.

Loss \$4.7 Million

Kaiser-Frazer Corp. has reported a loss of more than \$4.7 million for 1952. The loss was considerably smaller than the deficit of more than \$12.3 million incurred the previous year, but brings the total operating losses incurred by K-F since its incorporation in 1945 to more than \$51.2 million. The loss would have been greater last year had not earnings from defense work helped carry the

An interesting item in the financial report is that interest expense was more than \$4.45 million, or nearly equivalent to the total amount of the deficit incurred last year. The company operated at a profit during the last half of 1952 but earnings were not sufficient to overcome losses incurred in the first half. Significantly, however, the company estimates that operations during the first quarter of this year again will be in the red by approximately \$3.1 million although "it does not believe that this will be indicative of the operations of succeeding quarters."

The report does not break down the status of defense and automotive operations as was done in preceding statements but it is believed that automotive operations showed a loss during all of last year and currently accounts for the expected deficit for the first quarter of 1953. (Figures for K-F, in the May 1 issue of AUTO-MOTIVE INDUSTRIES, page 111, covered only the first nine months of 1952.)





HERMAN MUESHAM 38 years old, Wesleyan University graduate; wife, two sons. Formerly with Westinghouse Electric Corp., became General Supervisor of Material Procurement at Plasecki early in 1952.

NELICOPTER CORPORATION PEHNSYLVANIA TEL: SWARTHMORE 6.4000 April 8, 1953

Continental Screw Company Continental Screw Company New Bedford, Massachusetts

Remember the old proverb, "For want of a nail"! Nobody is more conscious of that than PHC. For not only do we rely on our own the country and that the photostall over the country as a second of the country are than 3,000 vendors all over the country a,500 workers, but more than 3,000 vendors all over the country a,500 workers. conscious of that than PHC. For not only do we rely on our own to country and the country but more than 3,000 vendors all over the country Everyone must do his share.

Everyone must do his share, help us put our helicopters together. Gentlemen: Screws and fasteners are one of the most important items in build-ing aircraft. We must rely upon our suppliers to consistently men

Screws and fasteners are one of the most important items in build.

Screws and fasteners are one of the most important items in build.

Screws and fasteners are one of the most important to consistently meet to consistently meet a constant on the constant of the constan Joe Deasey, our buyer, and I want to say thanks for the close coopera-tion you have always given us. That thanks comes too from the whole Joe Deasey, our buyer, and I want to say thanks for the close coopera-tion you have always given us. Piasecki Helicopter Corporation.

PIASECKI HELICOPTER CORPORATION

Herman Muesham General Supervisor Material Procurement

404 too can count on Continental.

1904

Manufacturers of HOLTITE Fastenings For Every Purpose

CONTINENTAL SCREW COMPANY, NEW BEDFORD, MASS., U.S.A.

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 64)

Battery for Handling Equipment

Meeting heavier demands on all types of battery-powered materials

handling equipment is the job for which the type T-H Exide Ironclad



Exide T-H Ironclad battery.

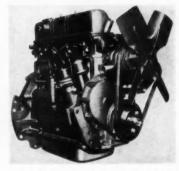
batteries were designed. Built to give 20 per cent more capacity in the same space, this line of batteries will be featured at the Exide exhibit.

The battery is, essentially, the Exide Ironclad employing the exclusive slotted tube positive plate, with new materials and structural changes incorporated resulting in increased capacity.

Positive plates are larger, grids contain corrosion-resistant Silvium which greatly contribute toward longer battery life. Polyethylene nonoxidizing slotted plastic tubes retain active material in constant contact with the grid spines, yet permit free electrolyte penetration throughout the active material. An added feature is the polyethylene acid-proof tube-sealer fitted to the bottom of the positive plate sealing in the active material. Electric Storage Battery Co., Booth 1145.

Circle M-23 on page 73 for more data





Addition has been announced of a four-cyl, overhead-valve model to a series of heavy-duty industrial engines which will be on display.

The 134 develops 45 bhp at 2400 rpm with a 3.4375-in. bore and a 3.6-in, stroke. Cylinders are cast enbloc of special high-grade iron and centrifugal cast sleeves are used. Freeturn valves are of high chrome nickel alloy. Ford Motor Co., Booth 1821.

Circle M-24 on page 73 for more data (Turn to page 166, please)

Specialized Production of HARDENED & GROUND PARTS



When you've served the automotive industry for more than 40 years as we have done, you become quite adept at machining difficult pieces like the Beam Ball shown here.

Ball O.D. is ground to 3.375" ± .001; Bore, to 1.375" ± .001. Circular contour is absolutely concentric with bore centerline. Scientifically controlled heat treating provides exceptional surface hardness and consistent strength throughout. The specified finish is Parco Lubrite, as used on many of our products.

This is a sample of the metallurgical engineering, precision grinding and uniform quality that can be readily applied to mass production of your turned, hardened and ground parts. Let us quote on your requirements. Write or wire today.

THE BROWN

213 BELLEVUE AVE.

SYRACUSE, N.Y.

King Pins' Shackle Bolts

Shackle Pins

Idler Shafts

Shafts

Wheel Studs

Brake Anchor Bolts Countershafts

Stub Axle Shafts

Steering Ball Bolts

5th Wheel Rocker

Water Pump Shafts

hardened and aroun

line, of any ahalysis steel, up to 41 :"

Beam Balls and Bolts

C. H. Ehlert, 3407 Claryondon Rd., Glereland • N. F. Spring, 4716 Ballour Rd., Detroit • R. Sanderront, BBB N. Clark St., Chicago • Harry J. Windmiltor, 1795 Carlson, Fort Worth • R. John William & Co., 1468 N. Spring St., Los Angelos, Call. • John B. Harry 1817 R.E. Yambil St., Portland, Orc.

Irregularly shaped holes are pierced in this stainless steel jet engine part to very close tolerances—automatically.

More than 40 holes in this automotive frame member are pierced simultaneously.

Cylindrical parts can be pierced (or related operations) from the outside in or inside out using an indexing type machine.

High Production Piercina

Seven irregular shaped holes and two trimming operations complete this automobile door inner window frame in one setup. Model changes can be made at little expense.

IN A SINGLE SET-UP

Based on a recent development in piercing technique, you can pierce more holes simultaneously—faster and with greater accuracy—on Danly Metalworking Equipment. Eliminate awkward multiple handling . . . pierce all holes faster in a simple, single set-up.

Built specifically for your piece part, these are only a few of the advantages of Danly Hydraulic Metalworking Equipment:



Write for this Bulletin today!

Consider these important features!

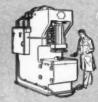
- . HIGH CAPACITY-Up to 225 tons available per cylinder.
- BREAKTHROUGH SHOCK PRACTICALLY ELIMINATED— Permits greater capacity without hydraulic circuit or tool trouble ... smoother, faster.
- AUTOMATIC STRIPPING—An integral feature of every cylinder... each station hydraulically strips its punch. This unique action simplifies fixturing, is practically foolproof.

• ACCURACY, FLEXIBILITY—Pierces practically any type of hole... round, oblong or irregular to very close tolerances.

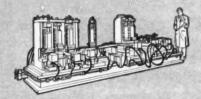


HYDRAULIC METALWORKING EQUIPMENT
MECHANICAL PRESSES . . 50 TO 3000 TONS

DANLY HYDRAULIC METALWORKING EQUIPMENT



General Purpose Gap Frame Piercing Press



Automotive Frame Piercing Machine



Automotive Inner Window Frame Piercing Machine



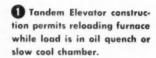
Jet Engine Shroud Ring Piercing Machine



BATCH - TYPE CONTROLLED ATMOSPHERE

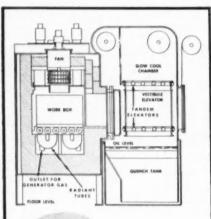
FURNACES

NOW GIVES YOU A SMALL FURNACE WITH THESE OUTSTANDING FEATURES-



2 Fan (5000 cfm) removable from outside and heat capacitors provide positive directional flow of atmosphere.

6 4 Vertically mounted Radiant tubes with 600,000 BTU per hour input with built-in generator.



MODEL "J"

The Dow Model "I" is a small mechanized furnace for production carbonitriding, gas carburizing, clean hardening, carbon restoration and bright annealing. It is the ideal furnace for small heat treaters and manufacturers where flexibility is required. Size: 7'10" wide, 14'4" long-head room 15'. Production capacity: 250-350 lbs. per hour on light case work.



OPTIONAL FEATURES

Hot Oil Quench system-provides exceptional distortion control. Large gas fired immersion tubes supply heat at low intensity thus minimizing oil breakdown.

Slow Cool Chamber permits cooling of a full furnace load in atmosphere and reloading without loss of time.

Delivery 8 to 10 weeks, depending upon orders on hand.

DOW FURNACE COMPANY

12045 WOODBINE . DETROIT 28, MICH.

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 164)

Self-Leveling Ramp

A self-leveling ramp embodying a self-contained power package which is claimed to facilitate installation of this unit at any loading platform, will be a feature at the Show. The ramp is powered by a short-stroke hydraulic cylinder. Cylinder, oil reservoir and electric motor oil pump are all mounted on a base plate which rests on the ground. The cylinder raises and lowers the projecting "lip" of the ramp through an arc of about 24 in. One end of the ramp is hinged to the edge of the loading platform.

This ramp is available in three standard types offering roll over load bearing capacities of 10,000 lb, to 20,000 lb. Platform sizes vary from five ft by six ft to six ft by eight ft. It also may be supplied with an extendable or retractable lip, hydraulic powered, to give the unit additional reach to contact the bed of a truck or trailer. During loading operations, the ramp rides on the truck bed, rising or lowering automatically as truck springs are compressed or relaxed. Globe Hoist Co., Booth 1252.

Circle M-25 on page 73 for more lata



Globe self-leveling ramp.

Fork Truck Sweeper

Announcement of many new features on Yard Bird fork truck sweeper has just been made by the manufac-

Of primary importance is the new (Turn to page 169, please)



Again . . . in 1952 . . . 100% of the winners in the Bus Transportation Maintenance Efficiency Contest used Spicer-equipped vehicles!

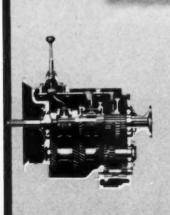
Year after year, this outstanding Spicer performance in the bus field is repeated. Spicer service records are noteworthy year after year in every field of automotive duty. They are the result of nearly a half-century of uninterrupted engineering and manufacturing progress.

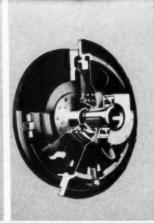
Spicer Spicer

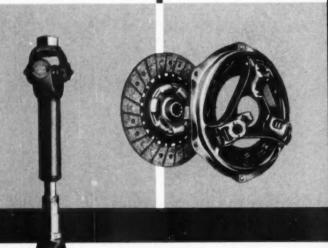
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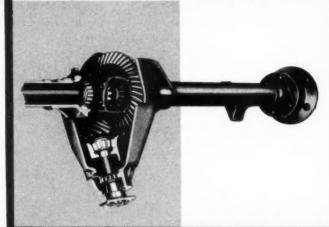






Billions of people moved faster, easier because of Spicer

Spicer furnishes high-precision equipment for practically every power-transmission need in automobiles, buses, trucks, tractors and other civil and military vehicles. With its ten modern production plants . . . and its skilled personnel in every department . . . Spicer can serve you fully, completely, dependably.





DANA

SPICER MANUFACTURING DIVISION of Dana Corporation - Toledo 1, Ohio



TRANSMISSIONS • UNIVERSAL JOINTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • PASSENGER CAR AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAIL WAY GENERATOR DRIVES • WEDDED TUBING

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 166)



Little Giant Yard Bird.

pick-up pan. This pan has three times the capacity of the one it replaces and has a dump bottom. Since the Yard Bird can be raised or lowered by the fork truck on which it is installed, the pan can be emptied into any height receptacle.

Another development on the product is the installation of casters and a flexible mounting. Such an arrangement causes the Yard Bird to "hug" the surface it sweeps, regardless of floor hills and valleys.

Mounting on the forks of any fork truck, it is said to sweep up to 80,000 sq ft per hr. A sprinkler attachment lays dust, and removal of the pick-up pan adapts the Yard Bird for snow removal. Little Giant Products, Inc., Booth 1805.

Circle M-26 on page 73 for more data

Truck for Materials Handling

To be displayed is the latest Load Lift materials handling truck. The same interchangeable mechanical and hydraulic features are applied in this model as in previous models, and the hydraulic system is of the non-leaking type.

The front axle support assembly and fifth wheel is now made of certified malleable iron instead of welded steel, and incorporates with it, as an integral part, the pivot for the han-



What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

dle hold up bracket. Both ends of the front link are furnished with hardened bushings. One of the most important additions has been a new type of semi-steel multi-ribbed wheel as standard equipment. On the 10 in. diam front wheels, standard on all models, there are 30 staggered ribs, 15 on one side and 15 on the other of a solid central web. This multi-rib-



Market Forge materials handling truck.

bing is said to reinforce the wide treads against breakage even when one edge passes over a hard obstruction. Rear wheels are ribbed in the same manner with number of ribs depending on diameter, but circumference spacing approximately the same. Market Forge Co., Booth 234.

Circle M-27 on page 73 for more data

388 KING PIN HOLES PER HOUR

On a Davis & Thompson 5 Station Machine

This type MDT FIVE STATION IN-DEXING DRILLER has five fixtures mounted on the index table. Each of these fixtures holds 2 RH and 2 LH automobile front suspension support arms. Four ROTO-MATIC Power Heads, each having four spindles, perform the following operations:

- 1. Drill 53/64" dia.—Half way through.
- 2. Drill .823" dia. Balance of way through.
- 3. End Cut Ream .8547/.8550" Full length of hole.
- 4. Finish Ream.8635/.8637"—Full length of hole.

5. Load and Unload.

Station Type Indexing Machine for drilling and reaming king pin holes.

Two RH and two LH pieces are completed at the end of each cycle. Cycling is automatic, and, operator loads and unloads during machine cycle.

4 New Davis & Thompson Mechanical Power Heads

Included in the design of this machine are the new ROTO-MATIC Mechanical Electrical Power Heads operated through screw feed. An important safety feature of these units is the patented overload release clutches on the feed. Because of the simplicity of their design the units require a minimum of servicing.

Free Data

Will be furnished on request.



Davis & Thompson Company 6411 W. BURNHAM ST., MILWAUKEE 14, WISCONSIN

Barrel Skid



Introduction of an all-magnesium barrel skid for drum and barrel handling, has been announced. Of welded construction throughout, the barrel skid is fabricated entirely of magnesium, and combines lightweight with certified, capacity-rated strength. According to the manufacturer, the unit speeds the handling of drums and barrels, reduces the risk of lifting injuries, and assures greater safety to men and equipment. The skids are available in standard sizes, ranging from five ft to 18 ft in length. Magline Inc., Booth 604.

Circle M-28 on page 73 for more data

(Turn to page 172, please)



Speed and Accuracy!

More and more—Kent-Owens
Machines get the call for countless milling jobs today—because they're rugged...simple...versatile. Twin-post head mounting assures balanced load. Greater cutting efficiency—only two gear contacts, motor to cutter. Write for bulletins on wide range of hydraulic and handoperated machines. Also, let our engineers help you with tooling and special machine requirements. Kent-Owens Machine Co., Toledo, Ohio.



No. 2-20

20" table travel . . . 42" x 12" table . . . full automatic hydraulic table feed.



No. 2-20V

20"table travel... vertical spindle with speed range 32 to 1284 R.P. M....42" x 12" table.



No. 2-20DS

Double Spindle for two milling operations at sametime... 20" table travel . . . 42" x 12" table.

No. 1-8

8" table

25" x 9"

automatic

hydraulic

table feed.

travel . .

table



Double Spindle for two milling operations at same time ... 14" table travel ... 32" x 9" table.





No. 1-M

Hand feed to table and head ... 25" x 9" table ... Adjustable head counter-balance.



No. 1-V

Hydraulic vertical head feed ... 5 ½" head travel ... 25" x 9" table.



KENT-OWENS REPRESENTATIVES

No. 1-14

32" x 9"
table . . .
14" table
travel . . .
hydraulic
table feed
. . full
automatic
cycle.



Call on

KENTOWENS

for milling machines

BOSTON
General Machinery Corp.
BUFFALO
Don W Patterson
CHICAGO
Four States Machine Tool Co.
Muster Machine Tool Co.

Buster Machine Tool Co.
DAYTON
Gossaer Mach'y Company
DETROIT
A.C. Haberboom Mach'y Co.
FT. WAYNE
Oatic Machinery Co.

GRAND RAPIDS Joseph Monshan INDIANAPOLIS Octis Machinery Co. KANSAS CITY Bichman Machinery Co. LOS ANGELES MILWAUKEE
Four States Mach'y Company
MINNEAPOLIS
The Satterfee Company

HARTFORD
Harrington Machinery, Inc.
HOUSTON
OliverH Van Hone Co., Inc.
INDIANAPOLIS
Outs Manahort Co.
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NEW YORK
Barrington-Wilson-Brown
Company
PHILADELPHIA
Calca Machinery Company

PITTSHURGH Barney Machinery Company

P. W. Schiefer Machinery Co. SAN FRANCISCO C. F. Bulotti Machinery Co.

ST. LOUIS
Blackman & Nueszei Mach'y Co.
Clarke Equipment Company
SYRACUSE
2. F. Owens Mach'y Company

J. F. Owens Mach'y Company
TORONTO, ONT.
F. F. Barber Mach'y Company
WALKERVILLE, ONT.
F. E. Barber Mach'y Company



RIVITORS



T-J RIVITOR used for automotive clutch plate assembly. Saves time and labor doing a four-fold job—assembling, setting, inspecting and ejecting.

DOUBLE RIVITOR sets two rivets at a time! Equipped with 10" hoppers, and tooled to automatically feed and set two 14" diam. x 8" long wagon

1/4" diam. x %" long wagon box head rivets at a time in elevator chain and raddle or elevator flight assemblies for farm implements. Controlled by one foot pedal.

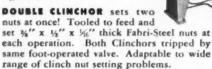


CLINCHORS



T-J CLINCHOR...
one of six special 8"
throat Underfeed
Clinchors used by a
large automotive
body manufacturer.
s and sets 1116" square

body manufacturer. Feeds and sets 116" square cased nuts in outside quarter panels, left and right hand.



Boost production . . . save labor with T-J Rivitors and Clinchors for many assembly jobs today . . . in aircraft, automotive, farm machinery, stampings of all kinds.

T-J CLINCHORS set clinch nuts 3 to 5 times faster! Fully automatic . . . controlled by a single foot pedal! Available in Underfeed and Gravity feed models, throat depths 8" to 36".

T-J RIVITORS automatically feed and set solid rivets... with high production! Electrically-powered Rivitor sets ½6" to ¼" diam. solid steel rivets up to ½" long. Air-powered Rivitor sets aluminum alloy rivets up to ¼" diam, or steel rivets up to ½" diam, and up to ¾" long. Throat depths 8" to 36".

Write for Clinchor bulletin 847; Rivitor bulletins 646 and 847. The Tomkins-Johnson Co., Jackson, Mich. TOMKINS-JOHNSON
RIVITORS AIR AND WYDRAULIC CYLINDERS CULTURE CLINCHORS

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 170)

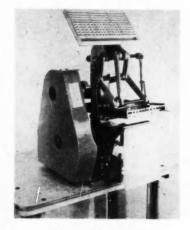
Portable Yard Ramp



To be displayed at the Show is a recently developed portable yard ramp. with a capacity ranging from 6000 to 16,000 lb is solving the problem existing in industry for years of loading and unleading freight cars from the ground level where no dock facilities exist, or when existing facilities are congested. Despite its size, the yard ramp is said to roll easily on its wheels and pose no problem for one-man-handling. Magnesium Co. of America, Booth 1126. Circle M-29 on page 73 for more data

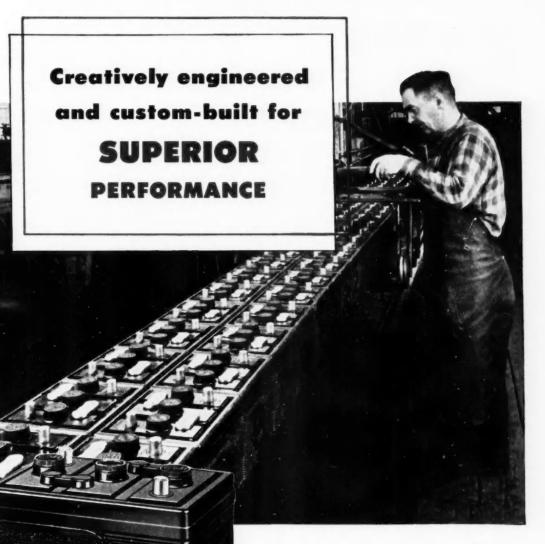
Marking Machine

Model 45A, a box, label, and product marking machine, will be demon-



Markem, Model 45A.

strated at the Exhibition. This machine has a maximum imprint of 25/16 in. front to back by 611/16 in. right to left. It is driven by a 1/12



GLOBE-UNION BATTERIES; specified by many leading original equipment manufacturers, Globe-Union-built batteries are mass merchandised under the name GLOBE SPINNING POWER and many private brands. They are available in a variety of basic sizes and types with special designs to meet special needs.

GLOBE-UNION INC.

Low freight costs, quick service: 13 Globe-Union Battery plants are strategically located near your mass markets.

Atlanta, Ga. • Boston, Mass. • Cincinnati, Ohio • Dollas, Texas • Emparia, Kansas • Hastings-on-Hudson, N. Y. • Los Angeles, Calif. • Memphis, Tenn. • Mineral Ridge, Ohio • Oregon City, Ore. • Philadelphia, Pa. • Reidsville, N. C.

IF IT'S PETROLEUM POWERED, THERE'S A GLOBE-BUILT BATTERY - RIGHT, FROM THE START!

To Get More Assembly Production, Use These Production Sockets

A wide range of sizes and styles in seven drive sizes makes it possible to get top efficiency on every application. Use this check list to see how Williams IMPACT "Supersockets" as can help you on all types of assembly and maintenance jobs.



1. 1/4 INCH SQUARE DRIVE — Single-Hex and Double-Square openings 3/16 to 3/8" in Standard and Bolt Clearance Lengths. Used on a wide variety of sheet metal and small subassembly work. Also available are sockets with carbide inserts for difficult driving problems with hardened self-tapping screws. Accessories include extensions, hexagon-square and magnetic shanks.

2. 3/8 INCH SQUARE DRIVE — Single-Hex, Surface Drive and Double-Square openings 5/16 to 3/4" in Standard and Bolt Clearance Lengths. Sockets in this drive size are also used for sheet metal and small mechanical assemblies of various types and include sizes for Zerk type lubrication fittings. Sockets with carbide inserts, extensions and hexagon-square shanks are also available.

3. 1/2 INCH SQUARE DRIVE — Single-Hex, Surface Drive and Double-Square openings from 3/8 to 1¼" in Standard and Bolt Clearance Lengths. Used for general assembly work including transmissions, differentials, wheel and fender mounting, etc. Surface Drive openings are widely used on multiple nut runners. They allow the driving unit to be freely engaged and disengaged with the work. Sizes and styles for straight and elbow Zerk type lubrication firtings, extensions and hexagon-square shanks are available.

4. 5/8 INCH SQUARE DRIVE — Single-Hex, Surface Drive and Double-Square openings from 1/2 to 1½" in Standard and Bolt Clearance lengths. Used for heavier general assembly work such as running gear components and heavier engine assembly. Surface Drive sockets with openings 5/8 to 1½" are available for use on heavy multiple nut runners. A variety of extensions and hexagon-square shanks are also available.

5. 3/4 INCH SQUARE DRIVE—Single-Hex and Double-Square openings 1/2 to 1-11/16" in Standard and Bolt Clearance lengths. These sockets are generally used on heavy equipment assembly such as trucks, buses, transports, farm implements and ordnance. They are also widely used in assembling automotive diesel equipment and for general plant maintenance. Extensions, adapters and hexagon-square shanks are available.

6. I INCH SQUARE DRIVE — Single-Hex and Double-Square openings 3/4 to 35%" in Standard and Bolt Clearance lengths. Used on heavy diesel equipment encountered in truck, bus, ordnance, marine and locomotive assembly. Also widely used for maintenance of heavy factory equipment and structural fabrication. Accessories include extensions for hard-to-reach applications, hexagon-square shanks and adapter for 3/4" drive sockets.

7. 1½ INCH SQUARE DRIVE — Single-Hexagon openings 1-5/16 to 3½" in Standard length. Used extensively on marine, railroad, earth-moving, ordnance and industrial equipment. Also for assembly and maintenance of machine tools, etc. Many of the smaller drive sizes are also used on this type of equipment where the requirements are not as rugged.

Write for Catalog A-100. It will help you in selecting the Williams IMPACT "Supersockets" that will give you the most production from your IMPACT drivers.

J. H. WILLIAMS & CO.

526 Vulcan Street Buffalo, N. Y.

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

hp motor and the recommended operating speed is 65 to 85 printing strokes per minute. Interchangeable work holding fixtures are said to allow printing variable detail on telescopic and shell lid boxes, boxes in the flat, loose labels, bags, tickets, and tags. Markem Machine Co., Booth 112.

Circle M-30 on page 73 for more data

Automatic Furnace Loader

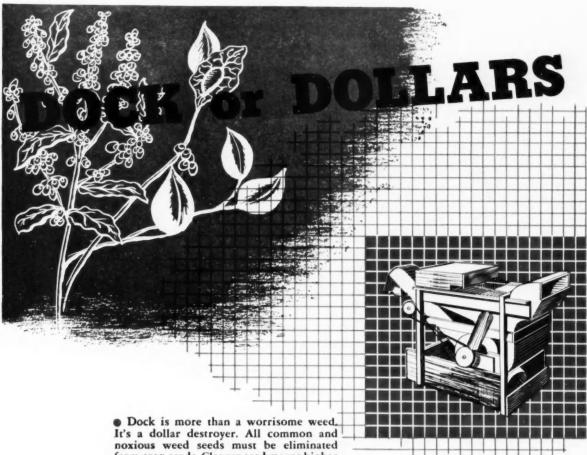
A heat treat furnace loader which automatically removes material from a hopper and discharges it in even and metered quantities into an endless helt type heat treat furnace will be on exhibition.



Michigan automatic furnace loader.

Called the Man-O-Steel, it uses a series of synchronized vertical-moving pushers, cut on a 30 deg angle. The submerged pushers remove parts from the hopper, raising them to the next level and causing them to roll off by the force of gravity. Material continues to be elevated and trans-

(Turn to page 178, please)



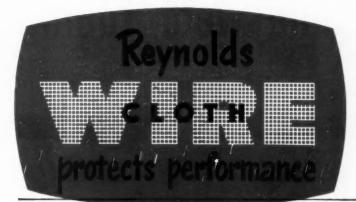
Over 200 sizes of wire cloth are carried in stock by the maker of this fanning mill for cleaning and separating seeds.

• Dock is more than a worrisome weed. It's a dollar destroyer. All common and noxious weed seeds must be eliminated from crop seeds. Cleaner seed means higher crop yields and greater farm profits. Again Reynolds Wire Screen Cloth is the farmers' friend!

In fanning mills...used by certified seedsmen and farmers... Reynolds Wire Cloth insures positive, selective separation in cleaning field, garden and flower seeds, grain, beans, etc.

The "screen shoes" in a fanning mill are really sieves for sifting and sizing. In a two-shoe series, the bottom one is wire cloth. Each type of seed or grain, differing ever so slightly, demands its own special mesh. That means many, many sizes of wire cloth, each with a weave and mesh accurate to the 'Nth degree.

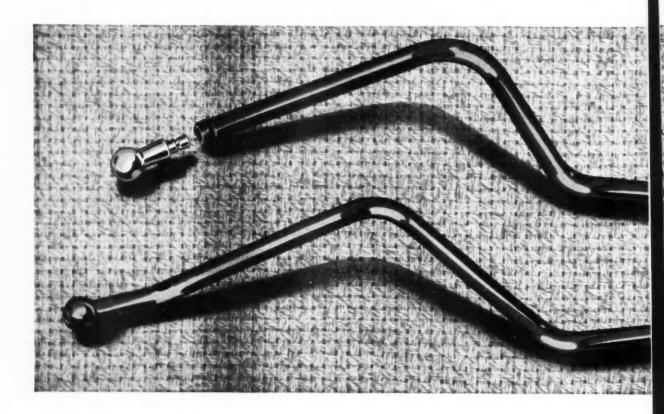
But, Reynolds precision processing extends to wire diameters, metals or alloys, temper, workability, weight, wear, finish—to meet industry's individual needs, strictly to specifications. Consult Reynolds Engineers. No cost or obligation.



REYNOLDS WIRE DIVISION, NATIONAL-STANDARD CO., DIXON, ILLINOIS

Divisions of National-Standard Co.





Three-piece accelerator rod simplified to one piece of Bundyweld Tubing



Bundyweld starts a a single strip o copper-coated stee



continuously ralled twice around later ally into a tube of



passed through a furnace. Copper coating fuses with steel.

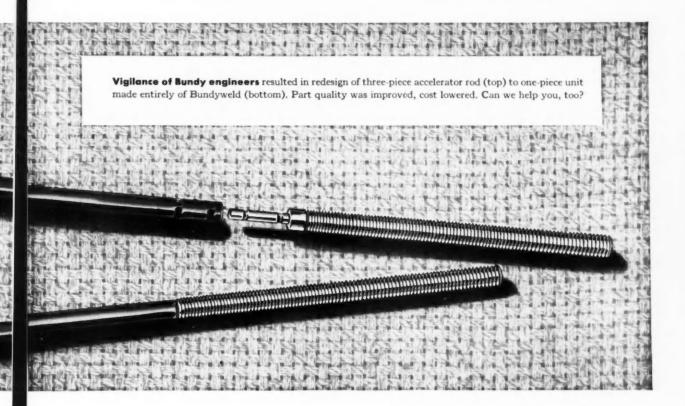


Bundyweld, double walled and brazed through 360° of wall



NOTE the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance

Bundy Tubing Distributors and Representatives: Combridge 42, Mass.: Austin-Hastings Co., Inc., 226 Binney St. • Chattanaoga 2, Tens.: Peirson-Deakins Co., 823-824 Chattanaoga Bank Bldg. • Chicago 32, Ill.: Lapham-Hickey Co., 3333 47th Place • Elizabeth, New Jersey: A. B. Murray Co., Inc., Post Office Box 476 • Philadelphia 3, Pens.: Rutan A. Co., 1717 Sanson St. • San Francisco 10, Calif.: Pacific Matals Co., Ltd., 3100 19th St. • Seettle 4, Wash.: Eagle Metals Co., 4755 First Ave., South Tenente 5, Ontario, Canada: Alloy Matals Coles, Ltd., 181 Pleat St., East • Bundy-weld in cited and Menal tubing is sold by distributors of nickel and nickel alloys in principal cities.



A Bundy customer's acceleratorrod design called for a threaded rod and a ball-end to be mechanically held in opposite ends of a piece of formed \(^{n}\)O.D. Bundyweld Tubing.

While we produced the rod according to specifications, our engineers took a good hard look at the part. They soon came up with a simple, sound idea to produce a stronger, more durable part at less cost to our customer.

You see the result above—a onepiece accelerator rod of Bundyweld Tubing threaded on one end, expanded and formed into a ball at the other. Perhaps you can see several factors that will work to your advantage, too.

Take Bundyweld itself, for instance. It's the automotive industry's standard of dependability. It's the only tubing double-walled from a single strip, copper-bonded throughout 360° of wall contact. It has high tensile strength, high yield strength, high fatigue limit. And, of course, there's almost nothing that it won't take in the way of fabrication beating.

When you hand us the design for a tubing part, we're geared to produce it in volume to your specifications—thanks to Bundyweld and thanks to our skilled men and Bundy-developed bending machines. But if we can suggest a cheaper way of making the part or a way of improving it, or both, we'll speak up. It's our policy to do so. If you're set up to handle your own fabrication operations, however, we'll be glad to ship you clean straight lengths of Bundyweld.

For an improved, lower-cost accelerator rod—or for that matter, for leakproof brake, gasoline, and oil lines, talk things over with a Bundy tubing specialist. Call, write, or wire Bundy Tubing Company, world's largest producer of small-diameter tubing.

BUNDY TUBING COMPANY . DETROIT 14, MICHIGAN

Bundyweld Tubing

What's NEW at the

MATERIALS HANDLING SHOW

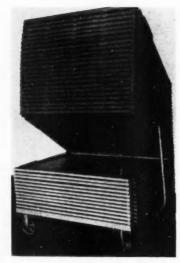
For additional information, please use postage-free reply card on page 73

(Continued from page 174)

ferred in this way through a series of cycles until discharged into the fur-

With this piece of equipment one man can load from 500 to 4000 lb per hr of small stampings, forgings or castings to the full capacity of the furnace for an indefinite run. Michigan Crane & Conveyor Co., Booth 501.

Circle M-31 on page 73 for more data



Rack multi-tier spring leaf truck.

Spring Leaf Truck

For handling between operations. this multi-tier spring leaf truck is claimed to be highly effective where materials should not make contact with each other.

Base is of heavy steel channel stock. Tiers are individually hinged to the heavy-duty upright frame.

Each leaf may be locked in semi-up position by two coil springs, one on a side. Welded steel casters are provided, but skid base types are available if preferred.

Units can be moved by hand or lift truck, and can be made in any size with any desired spacing between tiers. Rack Engineering Co., Booth

Circle M-32 on page 73 for more data

Pick-Up Conveyor

The latest ERKO pick-up conveyor to be shown, permits uninterrupted operation by conveying parts from ma-



Steel Products pick-up conveyor.

chines and loading them in handling or shipping containers away from the



parts this fast, simple way

Takes less than a minute to read, 2 minutes to set up.

No special skills are needed to detect the unbalance that causes vibration in rotating parts . . . when you use the TREBEL DYNAMIC BALANCER.

The unique TREBEL dynamic balancing principle applies a variable counter-vibration to counteract unbalance vibration. Direct readings in ounceinches give the amount of unbalance without further calibration; readings in degrees show location of unbalance.

That's why so many leading plants use the TREBEL.

Write for Catalog "B" or see a demonstration in your own plant

COMPANY, INC.

205 East 42nd St., N. Y. 17 • Offices in Cleveland, Detroit, Los Angeles, San Francisco, Housto Canadian sales by European Machinery Ltd., 11 King St., West, Toronto, Canada

178

MOTOR PRODUCTS

Motor Products stands foremost as a standard of quality in the manufacture of formed metal parts. With seven strategically located plants, Motor Products offers manufacturers a combination of experience and production facilities that assures the best answer to ANY metal finishing problem.

- Windshield mouldings
- Window ventilators
- Garnish mouldings
- Glove compartment doors
- · Radiator grilles
- Instrument panels
- Body mouldings

MOTOR PRODUCTS CORPORATION

WILL WITH MAN

11801 MACK AVENUE

DETROIT 14. MICHIGAN



WHICH POWER TYPE IS BEST FOR YOU?



...electric, gas, diesel or L.P. gas?

when the answer is *Electric* clark electrics are the answer ... Here's why:

- 1 Better battery efficiency—users report more work per amp-hour with CLARK.
- 2 Greater stability
 —safer for load,
 safer for operator.
- 3 Faster acceleration, greater speed —gets more work done, covers more ground.
- 4 Safer, smoother stops—with CLARK's positivecontrolled, reverse torque braking.
- 5 "Applicationengineered"—for special requirements, CLARK provides custom engineering.

No two jobs are exactly alike, so there's no such thing as one "best" power type. Which type is best for you?—that's the important question. The only person who can give a really unbiased answer is one who knows them all, and knows where they fit.

That's your local CLARK Dealer. He carries electric, gas, diesel and L. P. gas units—and he's got no ax to grind for any one. His object is to provide the one that's best for you. For example, careful application analysis often proves that electric trucks are best for certain jobs because of these advantages:

- ★ Economical operation on low-cost electric power
- ★ Long life, less maintenance—electrics have fewer, simpler moving parts
- * Smooth, vibration-free handling of fragile loads, less wear on truck
- * Quiet, clean operation

Which power type is right for you? No matter what it is, you'll find it in the CLARK line of quality handling equipment. You'll always be right when you buy from CLARK.



CLARK FORK TRUCKS
AND POWERED HAND TRUCKS, INDUSTRIAL TOWING TRACTORS

RETHAL TRICK DIVISION - CLARK EQUIPMENT COMPANY - DATTLE CREIK 68 MICHIGA

AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

What's NEW at the

MATERIALS HANDLING SHOW

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processing area. It picks up parts at the floor level at the side or back of screw machines, bolt machines, punch presses or other equipment. Parts travel on a table-top chain belt, with risers which form pockets and are lifted up an incline and drop into containers or onto a conveyor line.

Units may be built to specifications as to length, height and incline, and can be equipped with varable speed drive for timed flow to conveyor lines. Units are also made to deliver parts to higher or lower floors. Steel Products Fabricators, Booth 914.

Circle M-33 on page 73 for more data

Adjustable-Leg Crane



An adjustable-leg crane that has been recently placed in production will be exhibited at the Show. This Model HP-2A has a capacity of two-ton and is made with positive steering. The inside leg width of the crane can be adjusted to three locked positions. Legs can be spread out to S1 in. for straddle lifting operations and can be narrowed to 22 in. for passage through aisles. (Ruger Equipment Inc., Booth 1454).

Circle M-34 on page 73 for more data

Hydraulic Motors

Two sizes of vane motors, Series M2-300 and M2-400, recently placed in production, will be on exhibit. The motors supplement the previously released Series M2-200 and M2-500

(Turn to page 184, please)

1953
Mobilgas Economy Run
Proved Again
B-W
Overdrive

pays off:

Top 9 cars (on miles-per-gallon basis) including Sweepstakes winner—

25.27 MILES PER GALLON

Again this year the records proved: B-W Overdrive means more miles per gallon of gas!

all equipped with this famous Borg-Warner Transmission unit—averaged

In the grueling, 1206.1-mile Mobilgas Economy Run—sanctioned and supervised by the Contest Board of the AAA—the 9 best actual miles-per-gallon records were made by 1953-model cars equipped with Borg-Warner Overdrive.

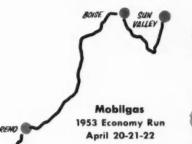
And in every year of this annual contest, the ton-miles-pergallon Sweepstakes winner has been equipped with this famous Borg-Warner transmission unit.

What better proof could you want of real fuel economy!

SAVES GAS-CUTS ENGINE WEAR

An advanced-type transmission, B-W Overdrive automatically cuts engine revolutions 30%. At 50, for instance, the engine is taking it easy at only 35! That saves gas. Saves engine wear, too—means longer life and fewer repair bills.

Made exclusively by B-W's Warner Gear Division, Overdrive is now offered on 13 leading makes of cars. Proof again that...B-W engineering makes it work—B-W production makes it available.



Toughest car driving contest in all the world... spanning all four seasons and all-year driving conditions in a 27-hour run of 1206.1 miles from Los Angeles to Sun Valley, Idaho, over a course with altitude from 19 ft. above

Sanctioned and Supervised by

Contest Board A. A. A.

altitude from 19 ft. above sea level to 7383 ft. above . . . from mountains to desert, and from icy roads to intense heat.





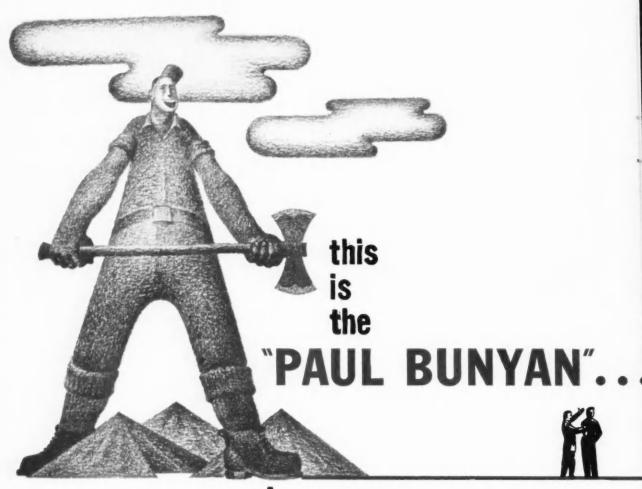


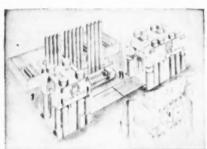






THESE UNITS FORM BORG-WARNER, Executive Offices, Chicago: ATKINS SAW . BORG & BECK . BORG WARNER INTERNATIONAL . BORG-WARNER SERVICE PARTS . CALUMET STEEL . CLEVELAND COMMUTATOR . DETROIT GEAR . FRANKLIN STEEL . INSERSOLL PRODUCTS. . INGERSOLL STEEL LONG MANUFACTURING . LONG MANUFACTURING CO., LTD . MARRYEL SCHEBLER PRODUCTS. MECHANICS UNIVERSAL JOINT. MORSE CHAIN MORSE CHAIN CO., LTD . NORGE . NORGE HEAT . PESCO. PRODUCTS . PEFLECTAL . ROCKFORD .CLUTCH . SPRING DIVISION . WARNER AUTOMOTIVE FARTS . WARNER GEAR . WARNER GEAR CO., LTD . WOOSTER DIVISION.





Twin Press Set-Up: Schematic shows how Bliss' 35,000 and 25,000-ton presses will be installed.

Write for the twelvepage Special Issue of the BLISS NEWS LETTER which describes the Bliss heavy presses in deta I. And it's in the machining stage now...

Bliss is building this press and another, its 25,000-ton teammate, for the critical USAF heavy press program—a program which promises to speed up production of the one-piece wing spars required by the stresses of sonic and near-sonic speeds.

Instead of today's time-consuming and costly machining of rough billets into single spars, these presses will allow Kaiser Aluminum to take a rough billet, give it a mighty multi-million pound squeeze and mold it into near-finished shape!

Just planning to build monster presses like these brings problems that stagger the imagination. To give you a quick idea: the size and weight of every major section had to be limited by the capacity of railroad rolling stock. In fact, in one case the main line of the Pennsylvania RR will have to be lowered five inches to allow under-bridge clearance for the largest of the press sections.

An unusual job in most respects, these presses nevertheless have one thing in common with all Bliss presses: the same creative press engineering. That's why Bliss, the world's largest press builder, always offers the right press—hydraulic or mechanical—for a given job, no matter what the capacity.

E. W. BLISS COMPANY, CANTON, O.

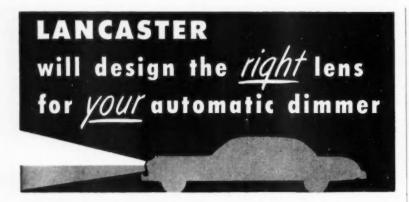
E. W. Bliss (England) Ltd., Derby, England
E. W. Bliss Company (Paris), St. Oven sur Seine, Paris
U. S. Plants in Canton, Salom and Toledo, Ohio; and Hastings, Michigan
Branch Offices and Dealers throughout the world

Remember: for Presses, Rolling Mills, Special Machinery-It's BLIS

HS-35000-8R-288-144

it's taller than a five-story building it weighs ten million pounds
it delivers a 35,000-ton squeeze
it will establish production precedents for the USAF Jet Program

BLISS

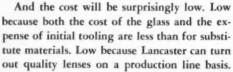


and Lancaster has the production facilities to produce your lens at low cost



Lancaster design facilities, backed by more than 40 years experience in the development of automotive optics, are at your disposal. Lancaster engineers are ready to help you design the lens which is exactly right for your automatic dimmer.

Lancaster production facilities can accommodate any design, in any quantity. Lancaster craftsmen specialize in precision workmanship on intricate designs. No matter what processes your specifications call for, no matter how complex the design, how exacting the tolerances, Lancaster can make the lens you need.



Take advantage of Lancaster experience and Lancaster facilities for the design and production of automotive optics. Send the details of your lens problem. Let us suggest how Lancaster glass can help you cash in on the automatic dimmer boom.

THE Lancaster Lens co.

LANCASTER, OHIO

industrial glass made to your specifications

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di			203	D-
-	JP (10	an	
m	all.	ne	wl	
100				
28		See.		
200	100			

TH	E LAN	CASTER	LENS	COMPAN
Lan	caster	1. Ohio		

- Please send more facts on how Lancaster glass will lower costs on our automatic dimmer.
- Please send information on other Lancaster glass applications in the automotive field.

NAME

ADDRESS

What's NEW at the

MATERIALS HANDLING SHOW

For additional information, please use postage-free reply card on page 73

(Continued from page 180)



Vickers hydraulic motors.

units and complete the range from five to 28.5 hp. They furnish a source of hydraulic rotary power for all types of mobile and industrial machinery applications.

These motors incorporate the design features of automatic pressure loading, automatic adjustment of both radial and axial clearances, maintenance of a lubricating oil film on both rotor faces and vanes, and light-weight construction. Exclusive "rocking beam" construction is used which provides intimate contact between vanes and cam ring. Rotating parts are in dynamic balance and free from vibration.

Unusual mounting adaptability is provided by four combinations of inlet-outlet port position, by a choice of face, flange or foot mounting and of either direct, belt, chain or gear drive.

Series M2-300 motors are available in 7.7, 10.2 and 12.8 hp output sizes, and Series M2-400 motors in 16.6 and 21.6 hp sizes. Vickers Inc., Booth 705.

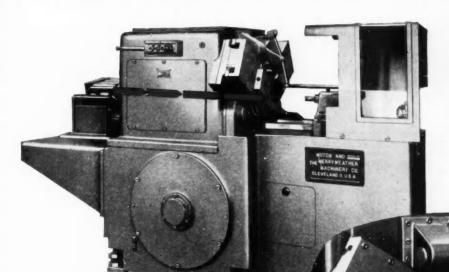
Circle M-35 on page 73 for more data



Low-Deck Trailer

A recently designed warehouse trailer has been made available with an eight in. high deck. Automatic couplers on the trailer are at standard height. Load capacity is 6000 lb and the deck size is 36 in. by 72 in. Wheels are six in. diam with 3½ in. face width. (Thomas Truck & Caster Co., Booth 901).

Circle M-36 on page 73 for more data



MP/SF
Most Production per Square Foot

Conveyor carries shells to hopper. Shells are fed automatically through hollow spindle, machined and ejected onto conveyor.

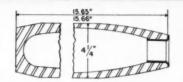
MOTCH & MERRYWEATHER

make the most of AUTOMATION

Material: shell steel SAE 1050.

Operation: bore, face, chamfer (nose end)

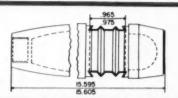
Estimated Production: 220 pcs/hr. @ 100%.



Material: shell steel SAE 1050.

Operation: face base, turn band groove and band relief.

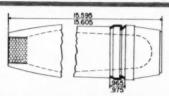
Estimated Production: 120 pcs/hr. @ 100%.



Material: shell rotating band.

Operation: turn band.

Estimated Production: 220 pcs/hr. € 100%.



This single-spindle, form-turning automatic, developed for civilian production, has been assigned to much heavy duty munition work.

Loading, positioning and unloading are completely automatic. All functions are actuated by hardened cams. With operator fatigue eliminated, one man can service several machines.

Manufactured by — THE MOTCH & MERRYWEATHER MACHINERY [O. —

CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Turning and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT





For additional information, please use postage-free reply card on page 73

(Continued from page 70)

Shell Mold Release Agent

Now on the market is a shell mold

release agent which is said to provide rapid and clean release from pattern plates, and causes little or no build-up on molds. Other features include no preliminary break in or pre-lube of patterns and smoother and more accurate dimension of molds. Advantages claimed for the mold release agent are more operating cycles per application, water emulsion type, no objectionable odors, non-corrosive to metals and stable in drum and diluted solutions. R. M. Hollingshead Corp.

Circle E-10 on page 73 for more data

Environmental Test Units

For high and low-temperature environmental testing a standard line of equipment has been designed to provide test conditions for the majority of all temperature testing requirements.

Comprising two separate units, the servo unit and the companion test chamber, the equipment furnishes controlled temperatures for conducting physical tests, weathering tests, and aging tests. The units may be purchased independently or collectively. A simple attachment will maintain relative humidity from ambient to 95 per cent in a temperature range from ambient to 180 F.

The servo unit is a portable air conditioning unit which can be connected to laboratory enclosures to provide air circulation of 40 cfm. At -100 F this circulation will absorb 1700 Btu per hr. At temperatures to 185 F this circulation is capable of delivering 5000 Btu's heating effect.

Low temperatures are achieved by circulating air over dry ice. High temperatures are achieved by circulating air around electric heaters.

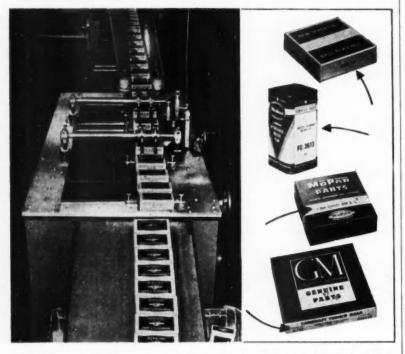
The companion test chamber, an insulated chamber in which tests are actually conducted, is available for use in conjunction with the servo unit. Attachment is by means of a simple fastening device which may be disconnected to permit the servo unit to be used as a source of conditioned air for other enclosures. Tenney Engineering Inc.

Circle E-11 on page 73 for more data



Tenney environmental test unit.

CUT PARTS PACKAGING COSTS by printing packages as you pack 'em



Here's the most efficient, most economical way to use a common package for a variety of parts or accessories. Print names, numbers, other product identification on one or more blank panels of your package . . . automatically — as it is packed . . . with the Gottscho MARKO-CODER. This proved-in-performance printing machine enables you to slash inventories of preprinted packages... reduce labor costs... cut unit package costs... eliminate loss from obsolescence... pre-

vent down-time on the line ... simplify inventory control. (The MARKOCODER package printing method also costs less, is neater and more accurate than labelling or separate-operation imprinting.)

The MARKOCODER prints cartons, boxes, cans, canisters, jars, etc... on top, sides, or bottom—synchronizes with speed of production line—adapts to both automatic and manual packaging operations. Quickly adjustable for copy changes, packages of different size.

Write for MARKOCODER Brochure "APM" today

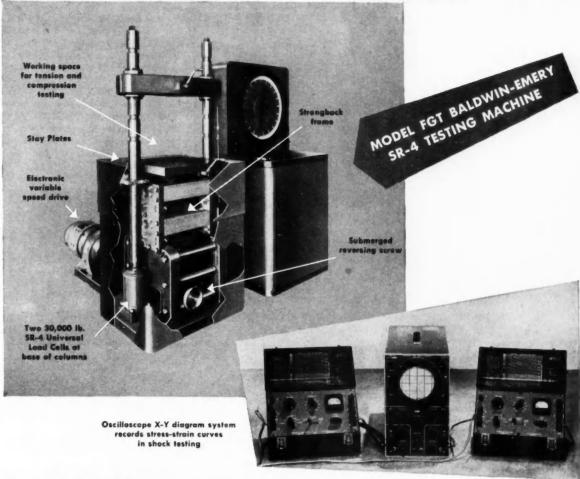
Gottscho

ADOLPH GOTTSCHO, INC.

Hillside 5, N. J.

50TH

NOW! A Machine Fast Enough for SHOCK Tests on Structures



The extraordinary high speed of response of this revolutionary new Baldwin-Emery universal testing machine, paired with an oscilloscopic X-Y diagram, enables it to measure and record shock tests on complete structures. Its SR-4 load cells and SR-4 type extensometer make it capable of responding to the rates required by shock conditions.

The load cells and extensometer feed signals to the oscilloscope through pre-amplifier circuits. An instantaneous stress-strain curve and its two axes then appear on the oscilloscope screen. It is possible to

have this screen photographed continually to record changes in the shape of the stress-strain curve as the structure itself changes.

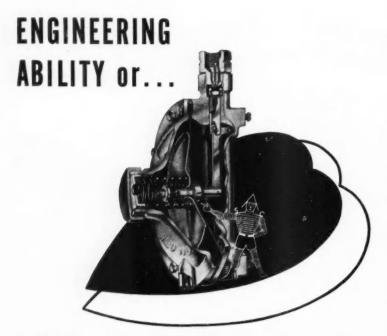
Its unique aptness for such shock tests is one of the reasons why the FGT SR-4 Testing Machine is being recognized as the greatest advance in materials testing equipment in twenty years.

Full details on this latest contribution of Testing Headquarters are in Bulletin 4202. For your copy, write to Dept. 2204, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

TESTING HEADQUARTERS



General Offices: Philadelphia 42, Pa. • Offices in Principal Cities



Why a good SPRING is necessary!

"This pressure reducing regulator is the HEART of the liquefied petroleum gas installation. On its performance depend the accuracy and reliability of the entire system . . . and the HEART of the regulator is the regulating spring which, because of its maximum length and large diameter, achieves super sensitivity and minimizes fluctuations in outlet pressures regardless of load demands."

Does this serve to make clear "Why a good spring is necessary"? Whether it's a comparatively simple or an infinitely complex piece of machinery . . . Automatic Spring Coiling Co. utilizes its superb *Engineering Ability*, the outgrowth of 30 years of spring specialization, to bring you the precision mechanical springs you need. Thus we are able to help you insure the successful and efficient performance of your product.

Make it a point to consult Automatic Spring Coiling Co. early in the job. Take advantage of our *Engineering Ability* to bring YOUR product up to peak operation with customized springs designed especially for you.

Our experienced engineers are ready to survey your requirements without obligation. WRITE



AUTOMATIC SPRING COILING CO. 4048 West Thorndale Avenue CHICAGO 30, ILLINOIS

News of the

MACHINERY INDUSTRIES

(Continued from page 65)

delphia Bronze & Brass Corp., Phila., Pa. Two lengths of nickel tubing, % in. OD, made by Superior Tube Co., Norristown, Pa., convey the water to-and-from the end of the spot-welding yoke (Circle A in Fig. 1) on which the electrode tip is placed. The hollow electrode tip fits over the brass tube which is screwed into the end of the yoke. Water to cool the tip flows up inside the brass tube and returns outside of the tube to the tip nickel tubing shown in the drawing.

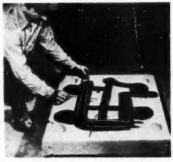


Fig. 2—Tubing is held in place in the mold by Monel Chaplets.

Body of the spot-welding yoke is Mallory 3 (chromium copper alloy) which pours at 2200 F. Specifications call for either nickel or Inconel tubing. Both materials are unaffected by the casting alloy at the pouring temperature. After the tubing is bent to shape, by hand, Monel chaplets are welded on both lengths of tubing to hold them in position in the mold, as shown in Fig. 2.

Toronto Fair

Biggest international machinery and plant equipment show on this continent is to be staged at the Sixth Canadian International Trade Fair at Toronto, June 1 to 12, occupying two-fifths of the entire space of the show. Twelve countries will be represented by manufacturers at the machinery, machine tools, plant equipment and precision instruments divisions of the Fair which is sponsored by the Candian Government to promote international trade.

The machinery and allied exhibits will cover approximately 110,000 sq ft and will be housed largely under one roof. While Canadian firms will

Large marine gear finishing practice moves ahead

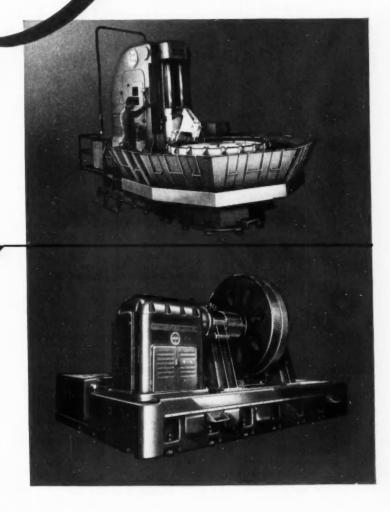
ABOUT 11 years ago the first Red Ring machine for shaving large marine propulsion gears (up to 96' PD) was completed and put into commission. Its high precision and spectacular economy promptly initiated the now accepted practice of shaving for such gears.

Since then Red Ring machines have been built to shave larger ma-



rine gears. The United States, our fastest and largest ocean liner, launched last year, is driven by reduction gears shaved on Red Ring machines.

And now, nearing completion is a giant shaving machine to finish marine gears 15 feet in diameter to almost incredible tolerances on tooth form, pitch, lead and surface finish. With slight modifications, this unit will handle gears up to 200° PD.





NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT



INDIANA GEAR WORKS, INC. • INDIANAPOLIS 7, INDIANA

occupy about half the total space, they will display the wares of several different countries since many foreign firms have set up Canadian distributorships or subsidiary companies. There will be about 110 individual firms in the section.

Approximately 80 U.S. exhibitors of machinery and allied products will be at the Fair, occupying 2160 sq ft of space. Some U.S. companies will use space in the Canadian section.

No data is yet available as to what new machinery will be shown, but much of the European machinery will be shown for the first time on this continent at the Canadian Fair.

Heald Will Attend

The Heald Machine Co., Worcester, Mass., plans to have three precision boring and grinding machines on exhibition at the Canadian event. Machines to be displayed are the Model 221 Bore-Matic, Model 271 toolroom grinder and, Model 2 tool sharpener.

Soviet Machine Tool Industry

- J. Mannin, commenting on recent developments in the Soviet machine tool industry in *The Engineers Digest*, states that the Russian engineers are looking toward the automatic factory and the most urgent development tasks for the near future are considered to be the following:
- Wider development of automatic production of blanks for machining by die-casting, press working, etc.
- (2) Development of fully automatic production methods for the manufacture of such typical machine components as sleeves, levers, and flanged fittings.
- (3) Further development of automatic assembly processes.

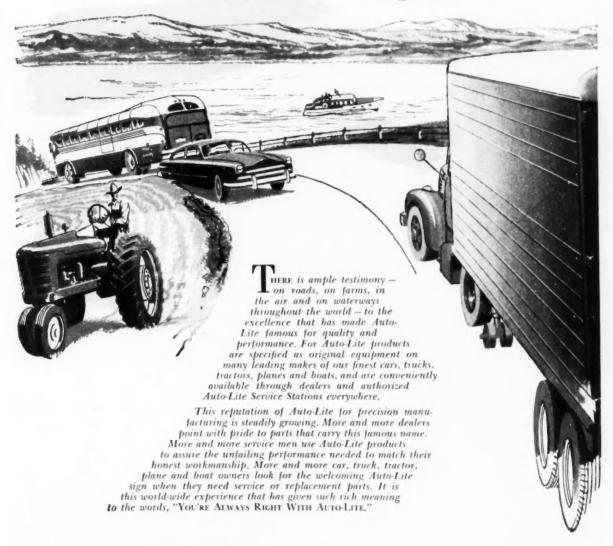
Mr. Mannin points out that nearly a hundred types and sizes of new machines for various kinds of hot and cold forging, stamping, and pressing had appeared since WW II. However, the fundamental weakness, according to Mr. Mannin, has remained and is officially recognized in the provision of the second post-war five-year plan which stipulates an eight-fold increase in the capacity of heavy forging presses and similar increases in other types of forging machinery.

During the most recent period, the machine tool works "Ordjonikidze," has created a system of automatic

(Turn to page 194, please)



Serving the world's constant demand for better transportation!





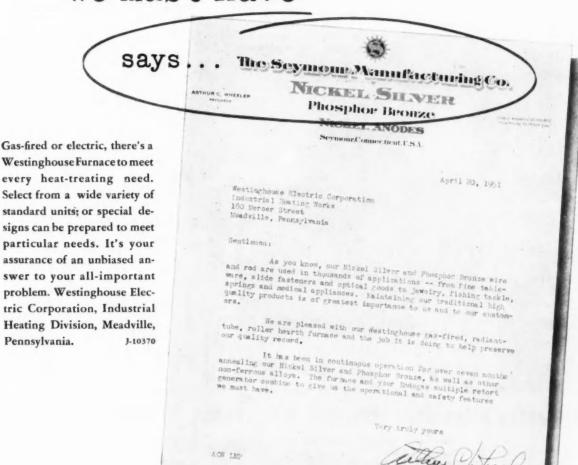
BATTERIES • BUMPERS • FUEL PUMPS • HORNS • GENERATORS LIGHTING UNITS • SPEEDOMETERS • SPEEDOMETER CABLE SWITCHES • STARTING MOTORS • INSTRUMENTS & GAUGES IGNITION UNITS • MOULDED PLASTICS • WINDSHIELD WIPERS WINDOW LIFTS • SEAT MOVING MECHANISMS • HUB CAPS WIRE & CABLE • SPARK PLUGS • METAL FABRICATED ASSEMBLIES • GRAY IRON CASTINGS • ZINC & ALUMINUM BASE DIE CASTINGS

- WORLD'S LARGEST INDEPENDENT MANUFACTURER OF AUTOMOTIVE ELECTRICAL EQUIPMENT





"Gives us operational and safety features we must have"





IF YOUR PRODUCT CALLS FOR HEAT-TREATING...IT CALLS FOR A WESTINGHOUSE FURNACE...

(Continued from page 190)

production lines for the machining of cylinder blocks for two different types of generating sets, another line producing cylinder blocks for tractors, and a further system for the machining of cylinder heads. In addition, there are automatic production lines underway for engine pistons (the first plant built in 1950 is in production), stepped shafts, spark plugs, piston rings, ball and roller bearings, and certain consumer goods.

Around the Industry

Parker Appliance Co. of Cleveland has acquired the complete JIC line of hydraulic accessories for machine tools formerly produced by the Hydraulic Div. of Sundstrand Machine Tool Co. of Rockford, Ill. The deal also includes equipment under development. Purchase price was not revealed for the cash transaction. The line of pumps, valves, and special hydraulic units previously made by Sundstrand to standards set up by the Joint Industry Conference on hy-

draulic standards for industrial equipment will broaden the Parker line of hydraulic accessories.

Built to release much needed manufacturing space, the new Lodge & Shipley administration building at 3055 Colerain Ave., Cincinnati, Ohio, is a strikingly modern example of functional design. It houses administrative personnel, engineering, tool design, time study and other departments, new employe and executive dining rooms and new sales demonstration facilities. Administration of both the adjoining manufacturing plant and widespread subcontracting operations are handled in the new building.

A financial transaction in the tool industry completed recently provided the Miller Mfg. Co., Detroit, Mich., with the full ownership of Bonney Forge & Tool Works, Allentown, Pa. The acquisition of Bonney represents another step in Miller's program to enlarge and diversify its manufacturing and marketing.

Europe's largest builder of heavy machine tools, Schiess A. G., Dusseldorf, Germany, is investing \$250,000 to form an American affiliate, American Schiess Corp., to provide technical assistance for users of Schiess equipment in the U. S. and Canada. General offices will be located at 205 East 42 St., New York, N. Y.

Screw Threads

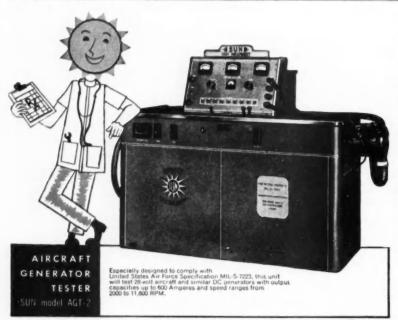
A most important and necessary handbook, recently published by the American Society of Mechanical Engineers, is said to be the culmination of 50 years of argument, conference and compromise. Titled "ASME Screw Thread Manual," it is a shop and drafting room abridgment of the American and Unified Standards for screw threads and their gages.

Mishandling

According to R. C. Sollenberger, executive vice-president, Conveyor Equipment Manufacturers Association, lifting accidents account for 85 per cent of all disabling injuries in the mishandling of materials. He stated, in effect, that safety is an integral part in the installation of the proper materials handling equipment.

Day for Tool Engineers

Last month a day was set aside to honor the tool engineers, and an extensive program was sponsored by several ASTE chapters in the New York area. Roger F. Waindle, ASTE president; Joseph E. Ridder, chair-



industry's leaders depend on Succe

... for special-order, built-to-specification scientific test equipment... Sun Electric Corporation is the world's largest manufacturer of Automotive and Aircraft Electrical and Electronic Testing Equipment, supplying approximately 70% of the testing equipment of this type to U.S. automotive dealers. That is why the leaders in every branch of the industry look to Sun as the logical choice to design and build special scientific equipment to meet their particular testing needs. The unit pictured is an example of a test problem solved with such specially designed equipment. Other Sun special-order units are in use in car, truck and tractor factories, aircraft and ordnance plants and in the factories of engine and component parts manufacturers everywhere. In production testing, spot checking and in quality control of material these special Sun Testers offer a high speed simplified operation that will save thousands of dollars and many production headaches.





Moraine Friction Materials

keep their built-in stability under all operating conditions

oraine friction materials have a number of characteristics that make them highly useful to many industries. For example, by dispersing non-metallic materials uniformly through a semimetallic or metallic matrix, the ultimate materials develop great resistance to wear and remain stable over a wide range of temperatures. In many cases the materials are bonded to a steel support which provides additional strength and increases the range of their application.

Moraine friction materials have proved themselves in automatic transmissions such as Powerglide, Dynaflow and Hydra-Matic. They are equally successful in special military vehicles and equipment, household appliances, and automatic transmissions for trucks of all sizes.

moraine products
sivision of General MOTORS CORPORATION, DAYTON, OHIO

SIX SPINDLE
PRE-SELECTIVE SPINDLE SPEEDS
TURRET TYPE AUTOMATIC INDEXING
DRILLING AND TAPPING MACHINE





Write today for detailed information.

BURG TOOL MANUFACTURING CO. DEPT. 418



man, Arma Corp.; Harold S. Vance, president, Studebaker Corp.; and Lt. Gen. K. B. Wolfe, president, Oerlikon Tool & Arms Corp. of America were the speakers at the affair. Several plant tours were held during the day.

BOOKS ...

GENERAL DISCUSSION ON HEAT TRANSFER, published by The American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y. Price, \$10.00. This book provides a comprehensive review of a decade's developments in the mechanism of heat transfer, in design of apparatus relating thereto, of new fundamental discoveries in the field, and of methods of approach to heat transfer problems. Heat transfer with change of state and between fluids and surfaces; conduction in solids and fluids; convection, radiation, instrumentation, measurement techniques, and analogies; and special problems such as heat transfer in turbine blade cooling, in liquid metals, in gas turbines and in piston rings, are con-cisely dealt with in its 93 papers. There are also complete accounts of discussions, critical summaries of the papers, hundreds of bibliographical references, and much hitherto unpublished material

STEEL CASTINGS HANDBOOK, published by Steel Founders' Society of America, 220 Midland Bidg., Cleveland 15, Ohlo. Price, \$4.00. Widely recognized by engineers, libraries, and university faculties as the official source of authoritative information on cast steel products and processes, this comprehensive handbook is considered unique in the completeness of its general data on steel castings, specifications, applications, design principles, mechanical and physical properties, and related technical materials. Now in its second printing, the completely revised volume, first published late in 1950 to supplant the original edition, incorporates 520 pages of text, 440 illustrations, and 120 essential tables. It includes 16 definitive chapters covering the entire range of steel castings activities, a brief history, and much specific data of value to engineers, designers, production executives, students, and others active in the metals working field.

CENTURY ON WHEELS: THE A CENTURY ON WHEELS: THE STORY OF STUDEBAKER, by Stephen Longstreet, published by Henry Holt and Co., 257 Fourth Ave., New York, N. Y.
Price, \$2.75. The brilliant history of one
of America's pioneer maker of highway
transportation, The Studebaker Corp., which for a hundred years has supplied wagons, carriages, and now automobiles, has been set against the backdrop of the burgeoning nation by the author. This story of a growing company, its trials, vicissitudes and triumphs, takes on a scope far different in flavor and read-ability from that of the standard "busi-ness history." It relates not only how the founding brothers nourished their infant South Bend, Ind., blacksmith shop into a giant among American companies even before the automobile was invented, and how Studebaker, alone of the 5000 wagon and carriage makers, successfully bridged the gap to horseless transportation, but also how the present management brought the company out of a depression-born receivership.



a deer napping

The wooded glen his home, the graceful leap his stock in trade . . . this fellow is always alert, a step ahead. With a long suit in intelligence, he knows just when to go—where to go. Once decided he's up and away, fleet afoot and fast.

Looking before you leap into the manufacture of a new product is very important. Chances are, by allowing yourself the time to plan ahead you will be ahead in the long run. Early investigation of castings offers you many benefits, especially when you consult Campbell, Wyant and Cannon. Experts in metallurgical engineering, precision control, mechanization of production, CWC provides you with castings that allow greater design freedom, wear longer, machine easier—all at much less cost.

Why not let CWC experienced engineers help you draw a bead on a better product? It might mean you'd have time to head for the woods and match wits with the wary deer.

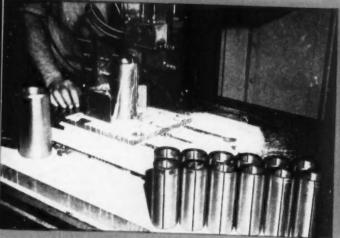
CAMPBELL, WYANT AND CANNON FOUNDRY COMPANY

Muskegon, Michigan

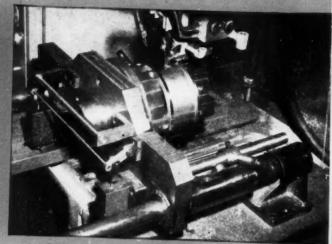


PRODUCTION

Low Cost Answer to Many Operations



SLOTTING Slotting bushings, using fixture and special heavy gage DoALL Saw Band to produce desired slot width.



SLITTING Cutting heavy duty bearings in half. Adjustable fixture handles parts up to 11" dia. x 14" length.

Blade speed indicator

Blade tension indicator

Table feed

Table feed pressure control

Blade speed

Blade welder

DoALL

... a versatile automatic production machine tool

4



CALL
DOALL
See your
Closelfied
Phone
Directory
for Local
Sales-Service
Stores





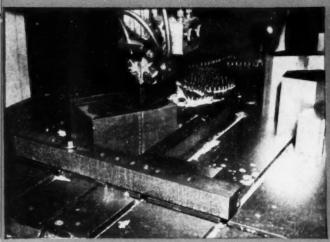
MACHINE TOOLS



CUTTING TOOLS

BANDSAWING

on Runs of Identical Parts



ANGLE CUTTING Back-up bar is boited to saw table. An angle is boited to back-up bar. Fully adjustable.



STOCK REMOVAL Excess stock required to hold pinions in gear cutter being removed automatically.

Use of Simple Fixtures Often Lets Bandsawing Replace More Costly Machining Methods

HOW the use of simple fixtures bolted to DoALL power feed bandsaw tables extends the usefulness of the machines in mass production work can be seen from the accompanying illustrations. Many jobs that would otherwise be performed on slower, more expensive machine tools are now being done on DoALL machines because of the user's ingenuity in devising fixtures.

The versatility of the DoALL Contour-matic makes it the preferred machine for production sawing. Variable hydraulic table feed, automatic

38 Sales-Service Stores to Serve You-See Your Phone Directory

stop, adjustable pressure coolant flow, adjustable pressure air flow to blow chips away from cut, blade speed range from 10 to 40,000 fpm, band tension control—these are a few of the features of this production machine.

To take advantage of the production economies possible with band machining, call your local DoALL Store, or write:

The DoALL Company
254 N. Laurel Ave., Des Plaines, III.



8.16



GAGING EQUIPMENT



INDUSTRIAL SUPPLIES



Bowser units for the cold treatment of metals, with ranges from -50°F to -200°F (and lower), have countless applications in the making of better metal products.

For example, Bowser cold treatment, in standard, economical units built for operation at -150° F, can:

- · Stabilize dimensions of precision parts, gages, etc.
- Increase hardness and wear resistance of carburized alloy steels: gears, shafts, pinions, etc.
- Prevent warpage and eliminate cracks resulting from grinding and machining.
- · Increase cutting tool life.
- Improve magnetic properties.
- · Speed seasoning of castings.
- Salvage expensive out-of-size dies.
- · Make possible faster, higher quality expansion fitting.

Request free descriptive bulletins describing new line of units.

TRY BEFORE YOU BUY

Why not investigate the possibilities of Bowser cold treatment in solving your metal working problems? Bowser metallurgists will be glad to cold treat your sample parts, tools or products—without cost or obligation.

Write For Details



ROWSER TECHNICAL REFRIGERATION

DIVISION BOWSER, INC. TERRYVILLE CONNECTICUT

More Defense Contract Awards

This latest list of defense prime contracts that have been awarded covers the period from March 18, 1953, to April 27, 1953. Items included in this list are for various types of automotive military equipment, including tanks, motorized gun carriages, trucks, warplanes, automotive components and spare parts, automotive maintenance equipment, etc.

-A-

Aero Equipment Corp., Bryan, Ohio Maintenance parts—Various—\$50,901 Aero Supply Company, Corry, Pa.

Valves and strainers—Various—\$81,-519

Switch assy.—Various—\$57,174

Aerocraft Metal Products, Detroit, Mich.
Vehicle parts—500—\$34,250

Aerol Co., Inc., Los Angeles, Calife Wheel assy.—2687 ea—\$113,065 Aerotherm Corp., Bantam, Conn.

Aerotherm Corp., Bantam, Conn. Seat assy.—200 ea.—\$83,600 Ainsworth Manufacturing Corp., Detroit, Mich.

Vehicle parts—3800—\$71,820 Aircooled Motors, Inc., Syracuse, N. Y.

Parts—Various—\$131,878

Airesearch Manufacturing Co., Div. of the Garrett Corp., Los Angeles, Calif.

Regulator, exchanger—Various—\$1,-764.221

American Bosch Corp., Springfield.
Mass.

Magneto assy.—150—\$36,315
American Chain & Cable Co., Detroit,
Mich.

Vehicle parts-600-\$32,196

American Generator & Armature Co., Chicago, Ill.

Vehicle parts 53-826—9000—\$208,800
American Locomotive Co., New York,

Small arms parts—11,000—\$115,500

Antico Manufacturing Co., Brooklyn,
N. Y.

Vehicle parts 53-681—125,000—\$60,480

Avco Manufacturing Co., Lycoming
Spencer Div., Williamsport, Pa.

Parts—Various—\$48,002 Parts—Various—\$47,002

— B —

Bendix Aviation Corp., Bendix Products Div., S. Bend, Ind.

Div. S. Bend, Ind.
Primer and carburetor assys.—Various \$118,372
Parts—Various—\$49,510
Nozzle assy.—30 deg—3000—\$540,790
Fuel injection assy.—74—\$540,790
Gasket cover pump—1500—\$540,790
Gasket flange—1500 ea—\$540,790
Strainer assy. fuel—180 ea—\$540,790
Gasket—1000 ea—\$540,790
Regulator assy, water—74 ea—\$540,-790
Gasket—200 ea—\$540,790

(Turn to page 204, please)

The SOFT Acting Clutch with the SURE GRIP!

Hand of Steel
in a
Velvet Glove

LIPE MULTI-LEVER CLUTCH

Lipe's soft-engagement, positive-grip Multi-Lever Clutch never needs babying. It engages smoothly—without grab, shock or jerk. All parts of the pressure plate touch at the same instant with the same pressure. There's no cocking—no point of high slippage and spot burning.

Result: More mileage between tear-downs.

Write for Service Manual and complete data on genuine Lipe parts—stocked in principal cities.

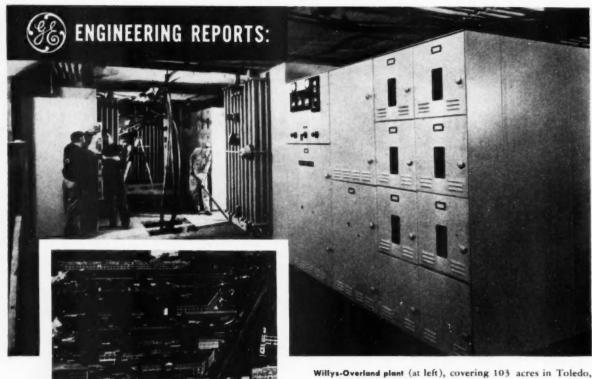


Clutch has 20 fingers that equalize the pressure of a single spring—assuring safter engagement and positive grip.

ADLL WRY

Like - ROLLWAY CORPORATION

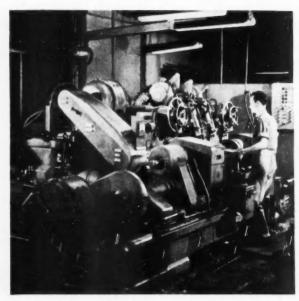
Manufacturers of Automotive Clutches and Machine Tools
Syracuse 1, N.Y.



AT WILLYS-OVERLAND-

O., adds five new G-E unit substations to expand simply and easily its radial distribution system. Total plant capacity is now 26,000 kva. Three of the 1500-kva subs (above), with two others, furnish power to aircraft landing gear division.

One of nation's first load-center



Grinder for Crankshaft pin bearings is powered by a G-E unit substation, 4160-volt to 440-volt, which is located just beyond screen at left, adjacent to the load area.



Installed since 1945, when original system was expanded, G-E unit substation, with Pyranol* transformer, has been operating 24 hours a day, 5 days a week, with low maintenance cost.

*Reg. Trade-mark of General Electric Co.



New load-center units are added to system which has operated for 13 years without power failure. Addition of new substations, like the two new 1500-kva units above, does not

alter over-all system, provides high degree of flexibility to handle shifts in plant loads. Unit subs, used as building blocks, can be placed wherever needed.

systems: Never a power failure!

G-E radial distribution system, installed in 1939, easily expanded to 26,000 KVA for increased plant loads

Flexibility in reliable power distribution for stepped-up production of Jeeps . . . quick, easy power expansion at little expense . . . low-cost maintenance with maximum safety. The Willys-Overland Company in Toledo found these advantages of its plant's radial distribution system multiplied when five new G-E 1500-kva load-center substations were added recently for greater plant capacity.

During the past 13 years of trouble-free operation, engineers have had first-hand experience with the low cost, simplicity, and reliability of the radial system. A G-E outdoor unit substation furnishes plant power, steps down utility voltage to a usable 4160 volts. Eighteen unit substations handle load requirements in more than two-score buildings on the 103-acre tract.

This installation is just one example of the way G-E engineering helps industry meet demands for more power. For further information, contact your G-E Apparatus Sales representative, or write for GEA-3592. General Electric Company, Schenectady 5, New York.



Outdoor G-E master unit substation, plus an indoor G-E station, furnishes power for 90 per cent of Willys-Overland capacity.

Engineered Electrical Systems for the Automotive Industry

GENERAL 👺 ELECTRIC

(Continued from page 200)

Bendix Aviation Corp., Eclipse Pioneer Div., Teterboro, N. J.

Parts-Various-\$27,044 Switch—Various—\$45,362 Generators—3089 ea—\$1,352,439

Bendix Aviation Corp., Red Bank Div., Eatontown, N. J.

Inverter—97 ea—\$80,347 Bendix Aviation Corp., Scintilla Mag-

neto Div., Sidney, N. Y. Parts-Various-\$519,844

Boeing Airplane Co., Seattle, Washington

Mobile training unit—\$18,125,820 Borg Warner Corp., Warner Gear Div.,

Muncie, Ind. Gear, and gear assembly-18,000-\$94,890

Vehicle parts 53-814-30,000-\$58,740

Bowen-McLaughlin-York, Inc., York, Pa. Tank, Recovery Veh. T74—\$968,864 The Bristol Co., Aircraft Equipment Div., Waterbury, Conn.

ontroller-92 ea-\$40,114 Bill Brown, Inc., Detroit, Mich. Vehicle parts-13,000-\$48,060

-c-

Campbell Chain Co., York, Pa. Vehicle parts-1700-\$27,319

Chrysler Corp., Detroit, Mich. Replacement parts for T48 & T43 pilot tanks-\$1,748 Coaxial mach, gun modific, T48 & T43-\$7,580

2 pilot model remming mechanisms T/43—\$9,152

Modify Ford-built T48 tank #564-\$6.844

Columbus McKinon Chain Corp., Tonawanda, N. Y.

Vehicle parts-12,000-\$256,560 Continental Aviation And Engineering Corp., Detroit, Mich.

Technical personnel—Lot—\$30,000

Curtiss-Wright Corp., Propeller Div.,
Caldwell. N. J.

Propeller assy.—2 ea—\$51,039

Kits—\$235 ea—\$68,764

Curtiss-Wright Corp., Wright Aeronau-

tical Div., Wood-Ridge, N. J. Maintenance spares-Various-\$52,-

-D-

Diamond T Motor Car Co., Chicago, Ill. Tank automotive parts - Various -

Vehicle parts 53-610-2000-\$26,654 Douglas Aircraft Co., Inc., El Segundo. Calif.

Maintenance—Various—\$26,375

Douglas Aircraft Co., Inc., Santa

Monica, Calif.
Fitting—39 ea—\$32,555
Parts—Various—\$44,716
Strut assy.—11—\$49,607

Camera kits-20 ea-\$1,545,895

Electric Auto-Lite Co., Cable & Wire Div., Port Huron, Mich. Hardware-534,000-\$94,669

The Electric Auto-Lite Co., Toledo, Ohio Cable, copper-Various-\$32,682 Spark plugs-217,995 ea-\$265,899

-F-

Facs Products Co., Inc., Chicago, Ill. Vehicle parts 53-813—2500—\$42,175 Fruehauf Trailer Co., Detroit, Mich. Vehicle parts-3500-\$42,525

-G-

General Motors Corp., Allison Div., Indianapolis, Ind.

Vehicular testing XT500 Transmission \$217,415

Vehicular testing of XT90 Transmission-\$237,625 Transmission assy.—250—\$1,975,000

Replenishment spare parts—\$392,940
General Motors Corp., Allison Div.,
Aeroproducts Operations, Dayton, Ohio

Services and materials-Job-\$99,999 General Motors Corp., Chevrolet Motor Div., Detroit, Mich.

Vehicle parts—32,157—\$37,026 General Motors Corp., Cleveland Diesel Engine Div., Cleveland, Ohio Repair parts-406-\$42,760

General Motors Corp., Delco Products,

Dayton, Ohio
Motor—497 ea—\$48,393
General Motors Corp., Harrison Radiator Div., Lockport, N. Y.
Repair parts—21,117—\$59,906

General Motors Corp., Oldsmobile Div., Lansing. Mich.

Gun, 90MM, T119E1-501-\$886,273 General Motors Corp., Packard Electric Div., Warren, Ohio

Cable, copper—Various—\$25,147 B. F. Goodrich Co., Akron, Ohio

Wheels and brakes-\$69,568 Greer Hydraulics, Inc., Brooklyn, N. Y. Portable cabin pressure testers-13 \$52,170

(Turn to page 206, please)

Engineered by Borg & Beck...

... means MAXIMUM PERFORMANCE MINIMUM MAINTENANCE!



You can depend on

CLUTCHES...FOR THAT VITAL SPOT WHERE

POWER TAKES HOLD OF THE LOAD!

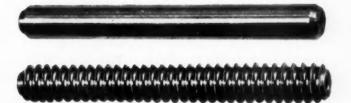


BORG & BECK DIVISION . BORG-WARNER CORPORATION Chicago 38, Illinois

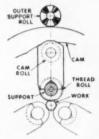
225,000 lead screws for ball track device at rate of

10 seconds per piece

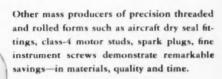
on NAMCO HYDRAULIC FORM AND THREAD ROLLING MACHINE



This lead screw for ball track parts is approximately $9/16^{\circ}$ diameter x $4-5/8^{\circ}$ long, 7 pitch single lead, made from 8620 high alloy steel on a TR-1 $^{\circ}$ Namco Roll Threader in lots of 50,000. Total 225,000. Production rate —10 seconds per piece.



This exclusive Namco design shows powerful straight-line-support, direct from behind the one piece circular cam through its slides to the work rolls. Elimination of linkages makes practical heavy feeds with high precision in fast cycle time.



The Namco TR-1" threader operates on either the plunge or feed through principle with either 2-roll heads for work ½ to ¾" diameter or 3-roll heads for ¾ to 1½" diameter. Heads can be changed in less than 30 minutes, with no other machine alterations.

The feed through job illustrated is manually fed; hydraulic loaders and magazine feeds are also available to put production on a fully automatic basis and with unskilled labor.

This roll threading process guarantees a degree of uniform smoothness and Brinell surface hardness not commercially possible by any other means as thread cutting, milling or grinding. No chips to salvage.

★ Send us your samples — get specific facts. Catalog TR-49A.

The NATIONAL ACME COMPANY

170 EAST 131st STREET .

CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8 Spindle
—Hydraulic Thread Rolling Machines—Automatic Threading Dies
and Taps—Limit, Motor Starter and Control Station Switches—
Solenoids—Contract Manufacturing.



(Continued from page 204)

-H-

Hercules Motors Corp., Canton, Ohio Vehicle parts—320—\$38,192 Holley Carburetor Co., Detroit, Mich. Parts—Various—\$32,899

-1-

International Harvester, Chicago, III. 5 Ton, 6 x 6 vehicles—854—\$19, 909.823

International Harvester, Evansville, Ind. Spare parts—Various—\$237,443

-J-

Jack & Heintz, Inc., Cleveland, Ohio Aircraft electric motors—20—\$32,130 Generator—6029 ea—\$162,896

Lear. Inc., Grand Rapids, Mich. Enclosed motors—20—\$25,598 Liggett Spring & Axle Co., Monongahela, Pa.

Vehicle parts—12,000—\$34,920 Loner-Wood Tool & Engineering Co.,

Detroit. Mich.
Vehicle parts—1800—\$32,166
Lord Manufacturing Co., Erie, Pa.
Mount assys.—Various—\$38,159

-M-

McCulloch Motors Corp., Rhodes Lewis Div., Los Angeles, Calif. Ejectors—1297—\$12,192 Compressors—1135

McDonnell Aircraft Corp., St. Louis, Mo. Control assembly—82 ea—\$36,678 Afterburners—\$225,000

Mack Manufacturing Corp., Washington, D. C.

Differential assy.—3800—\$2,256,516

The Glenn L Martin Co., Baltimore, Md.
Parts: maintenance—Various—\$30,107

The Maxim Silencer Co., Hartford, Conn.

The Maxim Silencer Co., Hartford, Conn. Mufflers—51—\$35,664 Minneapolis-Honeywell Regulator Co.,

Minneapolis-Honeywell Regulator Co Minneapolis, Minn. Vehicle parts—2600—\$601,199 Motor Wheel Corp., Lansing, Mich.

Vehicle parts—3700—\$217,375 Motoresearch Co., Racine, Wisconsin Vehicle parts—23—\$22,835

-N-

North American Aviation. Inc., Los Angeles, Calif.

Kits for installation—590—\$176,181 Kits for installation—590—\$87,620

Northrop Aircraft, Inc., Anaheim, Calif. Range finder T41—11 ea—\$67,700

-P-

The Pease Co., Fall River, Mass. Vehicle parts—20,000—\$26,094

-S-

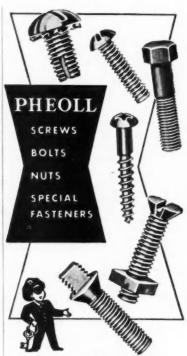
Simmonds Aerocessories, Inc., Tarrytown, N. Y.

Unit tank—Various—\$63,709

Sperry Corp., Sperry Gyroscope Co. Div., Great Neck. N. Y. Repair parts—14,928—\$55.097

Stewart-Warner Corp., Chicago, Ill. Vehicle parts—40,000—\$147,960 Vehicle parts—52,000—\$126,051

(Turn to page 210, please)



Will Keep Your Assembly Lines at Peak Capacity

Whatever you manufacture or assemble, you can speed production and improve your product by using Pheoli screws, bolts and nuts. These industrial fasteners drive easy and straight, and will not bind because threads are accurately rolled or machined. Precision-made screw and bolt heads, slots and head recesses prevent wrench and driver slippage. Count, too, the added bonus you receive by using fasteners that improve product appearance.

An interesting story on standard and special industrial fasteners and their profitable applications to your needs may be obtained from experienced Pheoll engineers. Ask these men to recommend screws, bolts and nuts that will increase your overall profits on assembly line work.









They're still talking in shops that use

J&L"1200'

COLD FINISHED STEEL

Shop records keep proving the logic of using J&L "1200" COLD FINISHED STEEL in terms of SUPERIOR MACHINABILITY HIGHEST QUALITY FINISHES DEPENDABLE UNIFORMITY EXCEPTIONAL EFFICIENCY

from machines and operations

J&L

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH

The list of shops making J&L "1200" Cold Finished Steel a permanent specification keeps growing. Production records prove—again and again—that here is a new, free-cutting steel with exceptional machinability and uniformity.

There are two things you should do today:

- Obtain complete information concerning J&L "1200" Cold Finished Steel.
- Try J&L "1200" Cold Finished Steel in your production line.

Here's a booklet that will help you . . . SEND FOR YOUR COPY TODAY!

Jones & Laughlin Steel Corporation 430 Gateway Center Pittsburgh 30, Pa. I'd like a copy of your booklet "J&L

I'd like a copy of your booklet "J&L 1200 Cold Finished Seel."

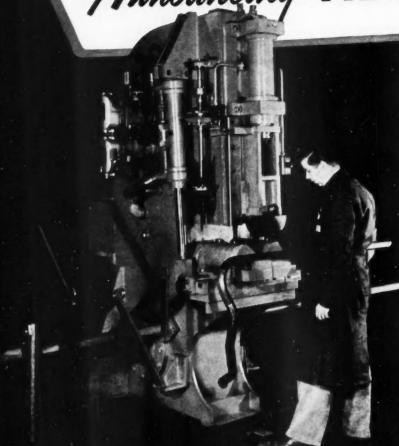
NAME_

COMPANY

ADDRES

AUTOMOTIVE INDUSTRIES, May 15, 1953

Announcing NEW PINES



Patents Pending

SPECIFICATIONS

CAPACITY

Hydraulic Power - 20 tons.

Tube Size Range — 1/2" through 2" O.D. Maximum 2" x .083 steel tubing.

Bending Clearance — 2" tube with 5" center-line radius to 180°.

Twin double-acting cylinders off-set mounted on sides of press, direct connected to heavy, needle bearing crank arms of wing die holders. Three anchor positions compensate for various settings.

DIE HOLDERS

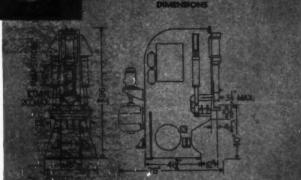
Forward-mounted, equally con-trolled wing-type with single screw adjustment and die recesses.

Welded HR steel frame work, stress relieved. Incorporates oil reservoir, pump, motor, and valve-mounting units.

ELECTRICAL

20 hp, 1200 rpm motor powers 2000 psi Vickers pump. 220-440 volt, 3-phase, 60-cylce. Control circuits on 110 volt through transformer.

New Pines 20-Ton Vertical Hydraulic Tube and Pipe Bending Press showing side-mounted twin oil coolers, panel-mounted hydraulic valves, side offset-mounted cushion, and 10-station automatic angle-of-bend selector turret. Note how design eliminating under die cushion mounting provides extra working clearance. On this setup, adjustable bars at left are used for positioning workpiece for various planes of bends.



INES Engineering co., inc.

Specialists in Tube Fabricating Machinery 656 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING . DEBURRING . CHAMFERING MACHINERY

20-Ton Tube and Pipe BENDING PRESS

DESIGNED WITH EXTRA WORKING CLEARANCE.... SPEEDS HANDLING BROAD RANGE OF MULTIPLE BENDS IN ONE SETUP

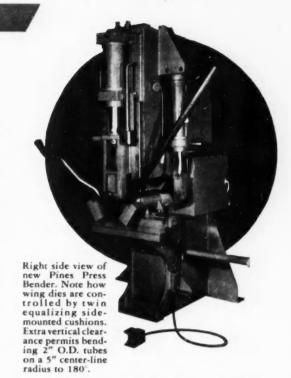
You'll find in the new Pines 20-Ton Hydraulic Press Bender a world of new production features, including those you have been wanting for a long time, that will help you substantially increase output and reduce production costs. You'll find the overall design affords greater working area on both sides and in front of the press and permits handling a much broader range of multiple bends in a single setup.

You'll like the new 10-station automatic angle-of-bend selector that eliminates cycling through idle stations, and the twin double-acting cushion cylinders on each side of the press that positively maintain a constant equalized pressure and help produce smoother, better bends without excessive flattening or distortion. Easy operating and setup features are included that save time and reduce operator fatigue.

These, and the many other outstanding Pines features listed below, will help you step up efficiency as much as 50% in handling, for example, automotive exhaust and tail pipes requiring a variety of bends in different planes, as well as the hundreds of other jobs adaptable to press benders.

OUTSTANDING FEATURES

- Twin Equalizing Side-Mounted Cushions eliminate base obstructions, provide greater working clearance, maintain constant torque, reduce flattening and distortion.
- Faster Cycling 10-station angle-of-bend selector indexes and resets automatically to starting position, eliminates cycling through idle stations, increases output.
- Greater Work Handling Capacity extra clearance reduces number of setups on multiple bending, permits broader use of uniform radii, cuts tooling and production costs.
- Interchangeable Pick-Off Turret for angle-of-bend control. Permits storing and remounting for repetitive jobs, reduces setup time, insures accurate duplication on repeat work.
- Adjustable Rum Speed Control assures efficient operation, simplifies setups. Ram can be lowered slowly or stopped at any point.
- Built-In Oil Coolers maintain uniform oil viscosity, assures uniform results on production runs.
- Single-Strew Wing Die Adjustment—eliminates problem of equalizing die settings. Adjusts both die holders simultaneously.
- Movable Foot Control assures maximum convenience, reduces operator fatigue. Master safety switch on ram slide.
- Sturdy Welded Steel Frame stress relieved, assures rigid die support, provides extra working clearance.
- Compactness Conserves Floor Space 100-gal. oil reservoir in base, motor vertically-mounted at rear, panel-mounted valves.



PROMPT DELIVERY — Write today for more data and prices on the new Pines High Production Bending Press. They are being lot-produced as standard units and prompt delivery can be made on early orders. They are designed and built by America's leading manufacturer of tube bending equipment.



Automatic Benders





Tube and Rod End-Finishing Machines



lench-Type ind-Finishing Machines (Continued from page 206)

Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.

Heat exchanger—169 ea—\$53,233 Heater—7637—\$1,734,820 Studebaker Corp., South Bend, Ind.

Kit, repair-7000-\$98,350

-T-

Thompson Products, Inc., Cleveland. Ohio

Pump assys.—Various.—\$337,837 Titeflex, Inc., Newark, N. J. Parts-Various-\$81,564 Conduit-11,750 ft-\$72,992

United Aircraft Corp., Chance Vought Div., Dallas, Tex.

Strut and duct assy. - Various -\$165,413

United Aircraft Corp., Hamilton Standard Div., E. Hartford, Conn. Materials and services—Job-\$390,212

United Motors Service, Detroit, Mich. Combat vehicle-10,000-\$35,500 Vehicle parts-15,000-\$388,030 Vehicle parts Neg.—8000—\$43,040 Vehicle parts—12,000—\$38,280

United States Rubber Co., Fort Wayne, Ind.

Vehicle parts-55,300-\$195,105

Vickers, Inc., Detroit, Mich. Wrench, accumulator-Various-\$33,912

- W -

Wagner Electric Corp., St. Louis, Mo. Vehicle parts-75,350-\$79,449

Westinghouse Electric Corp., Philadelphia, Pa.

Gear and clutch pack assy.—Various \$130,133

The Wilcolator Co. Elizabeth, N. J. Vehicle parts-45,000-\$93,150 Woodward Governor Co., Rockford, Ill.

Repair parts-10,279-\$26,108

Self-locking **Bolts and Screws**

Eliminate costly safety wiring, lock washers, jam nuts!

Now you can do a real fastening job, put your product together faster, and drastically reduce manufacturing and maintenance costs. Here's how:

No other method equals the Nylok principle of locking threads securely in any position-seated or unseated. The smooth wedging action of the nylon insert does it! The lock is vibration-proof, and the ONE-PIECE construction ends laborious fussing with separate auxiliary parts, such as safety wiring, lock washers or jam nuts. The lock is always there -the operator can't forget to apply it. Extra security and ease of service give your product enhanced sales value - and you save plenty on assembly operations.

Nylok bolts and screws also provide a leakproof seal where liquids are present. They will not mar mating surfaces and can be used over and over again.

SIZES #6 UP: LENGTHS % INCH UP

IMMEDIATELY AVAILABLE

- ONE-PIECE NYLOK

CORPORATION, 475 Fifth Ave., New York 17, N.Y. FACTORY: Elmira Heights, H.Y.

rers of Nylan-Locked Fasteners. Covered by U.S. patents and patents pending. Please send Bulletin 8 on Self-Locking Bolts and Screws.

State

Title

USE THE COUPON FOR QUICK INFORMATION

BOOKS

SCREW THREAD MANUAL, published by The American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y. Price. \$2.50. This new manual supplies shopmen, tool designers, and draftsmen with the information they need when selecting, designing, testing or making the most used screw threads. Here in 68 pages are the limits of size for threads constituting the bulk of use, i.e., standard coarse, fine, and eight-pitch thread series of classes 2A and 2B from the smallest to those of 1½-in, nominal diameter. By simple arithmetic, the manual shows how to calculate all other standard threads of the American Unified threads and special threads of the new A and B classes. It gives gage limits of sizes similarly restricted in range and an example for calculating omitted limits of seldom used gages. In addition, there are concise descriptions of the thread features and applications and important related informa-tion not found in the standards. Among its handy tables are: one which show at a glance the available pitches of thread for each diameter . . . another having the inch limits of size converted to milli-meters for the most used threads to enable speedy interpretation of specifications received from or sent to countries that use the metric system . . . and still another giving compactly the formulas for all major, pitch and minor diameters for the six unified classes.

HOW TO DRAW CARS OF TOMOR. ROW, by Henry A. Gurr, published by Dan Post Publications, Arcadia, Calif. Price, \$2.00. Progress in motor car design has been contingent to a vital degree upon original conceptions from the vivid minds of young artists. This is the irrevocable record reflected in the past and the present of the industry. Here is a book to light the guideposts for the pencil pidler—and, as well, for the latent professional automobile designer—that motor car styling may continue to progress. Comprehensive primary text and graphic supporting illustrations pick up each would-be stumbling block in the potential designer's progression and make it known and understood, before following the design path to the next element toward professional finesse. Practice in each fascinating step is presented, from general perspective to highlighting chrome. In the case of a final rendering which merits further consideration, mechanical limitations, seating comfort, handling convenience, safety, engineering changes, and interchangeability become prime considerations.

Engineered to Excel IN THE TOUGH JOBS...

SCHOOL BUS

CONTINENTAL RED SEAL POWER





Underlying the fine record of Continental Red Seal engines as power for trucks, buses, and other exacting applications is a full half-century of uncompromising stress on engineering—emphasis which has carried through to even the smallest details.

Take the valve assembly in the cutaway illustration. The inner and outer springs, you note, are wound in opposite directions, doing away with all possibility of pinching or interference when compressed. This detail, tiny in itself, typifies the countless

"tremendous trifles" which combine with major engineering features to make Red Seal engines the dependable product they are.

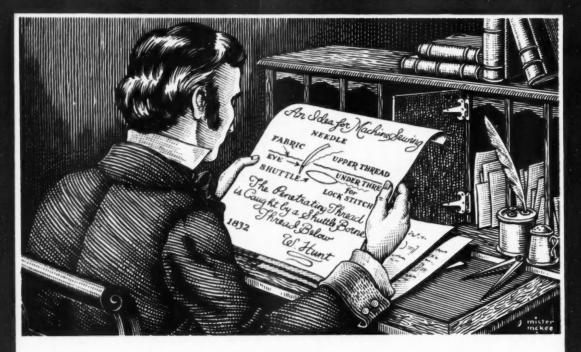
As for these major features, the list is long and impressive. It includes the exclusive Continental system of individual porting . . . full-length water jackets . . . patented oil and dust seals . . . leakproof water pump . . . multiple cylinder-head studding . . rifle-drilled oil galleries . . . balanced crankshaft with Toccohardened journals . . . and many, many more.

FOR PERFORMANCE, ECONOMY AND STAMINA BORN OF ENGINEERING LEADERSHIP, AND BACKED BY PARTS AND SERVICE FACILITIES THROUGHOUT THE WORLD, STANDARDIZE ON EQUIPMENT WITH RED SEAL POWER.

Continental Motors Corporation

MUSKEGON, MICHIGAN





Two Million Dollars for a Needle

Sewing is probably as old as mankind, but not until the year 1832 did the hole move to the point of the needle, so that machine sewing became possible. Walter Hunt of New York City had this great idea, combining with it the shuttle-carried lock-stitching thread on the underside of the fabric.

Elias Howe usually gets credit for inventing the sewing machine, but actually he worked out the idea twelve years after Hunt. Howe, you see, had the good sense to patent the idea. It brought him over two million dollars.

It's great to have an idea. It's much more wonderful to make it work. That's where we come in.

Often difficult and unusual problems are involved in operating mechanisms that depend on pliable parts. These must be composed and designed for continuous dependable service under a wide variety of environment and operating conditions, often in the presence of deteriorative materials or conditions.

For such critical parts, perhaps the most versatile and reliable material ever developed is SIRVENE. This is an oil-resistant elastomer (loosely called synthetic rubber) compounded in formula as will best meet the specific need.

SIRVENE engineers are constantly working on pliable part problems, in scores of fields. They are constantly developing new SIRVENE compounds. And when design and compositions are determined, C/R quantity production takes over, operating at laboratory-quality level.

Let SIRVENE engineers work with you from the inception of your idea for a new product. They can short-cut your work, protect you in advance against disappointment.

"Engineering with Sirvene" will be sent with our compliments if you request it. It belongs in your files. Sirvene products include diaphragms, boots, gaskets, oil seals, washers, packings and similar molded parts.

CHICAGO RAWHIDE MANUFACTURING CO.

1310 Elston Avenue SIRVENE DIVISION Chicago 22, Illinois



STRYENE

SCIENTIFICALLY COMPOUNDED ELASTOMERS

SIPVIS

MECHANICAL

LEATHER PRODUCTS

Soon, displacement, postulare and
eather products that product dependeather products difficult opereating conditions.

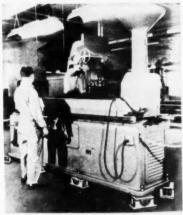


Penrosafethus in Fiese Principal Chies Letter * Res Terk • Tyrkus • Bytish • Philistoph Pittsbergh • Chelment • Costand • Babeb • Pearl Mismopalis • Within • Hauses • Lee Angelo San Proncise

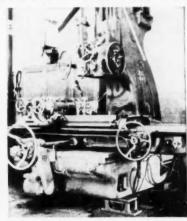
- Cam Design and Tool Selection Conference, Rochester Inst. of Technology, Rochester 8, N. Y. Single Spindle Group May 18-20 Multiple Spindle Group May 20-22 Materials Handling Exposi-5th Annual Management Clinic, So-
- ciety for Advancement of Management. Rackham Memorial,
- Society for Experimental Stress Analysis, Spring Meeting, Hotel Schroeder, Milwaukee, Wis.. May 20-22
- Society of Photographic Engineers, Third Annual Conference, Hotel Thayer, West Point, N. Y...May 20-22 7th Annual Quality Control Convention, Ben Franklin Hotel and
- Convention Hall, Philadelphia, American Gear Manufacturers Association, Annual Meeting, The Homestead, Hot Springs,
- May 30-June 3 1st Annual Michigan Motor Show, State Fair Grounds, Detroit..June 2-7
- SAE Summer Meeting, The Ambassador and Ritz-Carlton, At-lantic City, N. J. June 7-12 2nd International Aviation Trade
- Show, Hotel Statler, New York, N. Y.June 9-11 Le Mans 24 hr. race, France ... June 13-14
- Exposition of Basic Materials for Industry, Grand Central Palace, New York, N. Y.June 15-19
- Iowa Management Course, State U. of Iowa, Iowa City. June 15-27
- State U. or lows, lows city, and a American Welding Society, National Spring Technical Meeting.
 Shamrock Hotel, Houston, Tex.
 June 16-19
- British Empire Trophy Race, Isle of ManJune 18 Motor Vehicle Fleet Supervision
- Course, Northwestern U. Traffic Institute, Evanston, Ill. ...June 22-26
- Motor Fleet Supervisor Refresher Seminar, Northwestern U. Traffic Institute, Evanston, Ill. June 25-26
- 20th International Aeronautical Meeting, Le Bourget Field, Paris, FranceJune 26-July 5
- American Society for Testing Ma-terials, Chalfonte-Haddon Hall, Atlantic City, N. J....June 29-July 3 Sixth Annual International Aviation
- Exposition, Detroit, Mich. .. July 9-12
- E International West Coast Meeting, Georgia Hotel, Van-couver, B. C. Aug. 17-19
- National Aircraft Show and 50th Anniversary of Powered Flight, Vandalia Airport, Dayton, O. Sept. 5-7
- SAE National Tractor Meeting and Production Forum, Hotel Schroeder, Milwaukee, Wis. Sept. 14-17
- Eighth National Instrument Conference and Exhibit, Chicago, Ill.Sept. 21-25
- Paris Salon, FranceOct. 1-11 38th International Motor Show, Earls Court, LondonOct. 21-31

CALENDAR STOP VIBRATION

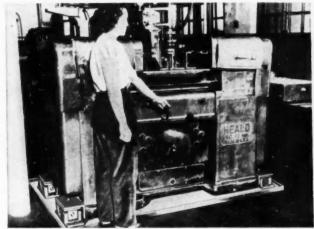
KORFUND VIBRATION CONTROL



This Thompson 12" x 60" Surface Grinder is installed at Firth Sterling, Inc., Pittsburgh, Pa. Vibration from grinders affected precision testing equipment on floor below; vibration and noise was also extremely annoying in executive, sales and laboratory offices. Korfund Isolators directly under the grinders, completely solved the problem. Korfund Units stop vibration and insure quieter machine operation.



This Pratt & Whitney 238 Jig Borer is installed at Caterpillar Tractor Co., Peoria, Illinois. Korfund Vibro-Isolators protect this precision machine against severe external vibration from trucks and trains which had made accurate work impossible. Isolators are set in packets made by removing wood block flooring. Korfund Unit stop vibration and reduce rejects—improve work evality.



This is one of the Heald #49 Bare-Matics installed at Thampson Products Co., Cleveland, Ohio. Shock transmitted from one automatic boring machine to another caused intermittent skips and gauges. One machine had to be kept idle until both were mounted on Korfund Isolators. Now they operate together and turn out perfect work. Korfund Units stop vibration and increase production.

Korfund Vibration Control also: permits more efficient plant layouts, decreases original building and foundation costs, permits installations without reinforcement of floors, reduces machine maintenance costs, and lengthens machine life.

Standard Korfund Isolators are available for most applications. A Selector Chart giving recommendations for both normal and critical conditions is available. See Sweet's Caralog Files or write us for Bulletin No. 5.

For specific recommendations, contact us or your local Korfund office. A half century of experience is at your disposal.

THE KORFUND CO., INC. KORFUND 48-02A Thirty Second Place, Long Island City 1, N. Y.

In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

AIRBRIEFS

(Continued from page 80)

tion and now have captured 55 per cent of the first-class travel market in America. Airlines have dominated the intercontinental travel market (over shipping lines) for seven straight years. These data are a fitting monument to this 50th Anniversary Year of Powered Flight.

New Sabre Best

After nearly two years of admitted performance inferiority to the MIG-15 Red jet fighter, the North American F-86F now holds mastery in Korea in every performance category. The new model is powered by a General Electric J47-GE-27 turbojet engine of well over 6000 lb of thrust which provides superior maneuverability for the Sabre over the MIG at all altitudes, according to Korean

Reports. Previously the Sabre was faster than the MIG only up to certain altitudes, depending on airplane weight for the mission but never above 30,000 ft.

Supersonic Prop

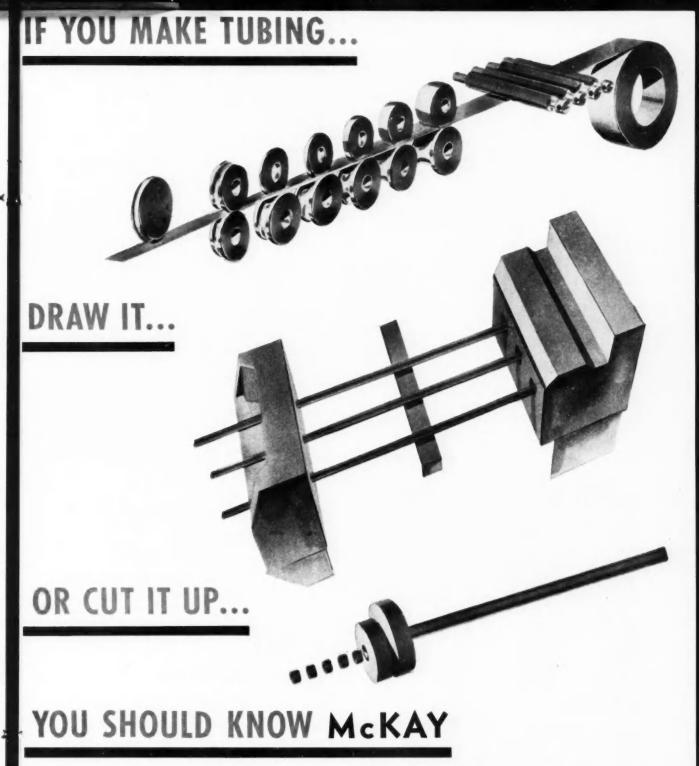
After some five years of technical discussion, the supersonic propeller is going to be given its acid test this summer. Three Republic F-84H fighters powered by Allison turboprop engines will be test flown at Edwards Air Force Base, Calif., using Curtiss, Hamilton Standard and Aeroproducts supersonic propellers. The Thunderjet, heretofore a pure jet fighter, was selected for the conversion due to its high speed and the wide availability of comparative data for evaluating the prop-driven models. While even conventional propellers in large sizes experience sonic speed at the tips at maximum engine and airplane speed, the supersonic propeller is designed to operate with a substantial portion of its blades operating at supersonic speed. The supersonic propeller is designed to operate with a substantial portion of its blades operating at supersonic speed. The supersonic propeller need provide only 50 per cent efficiency in power conversion to equal that of the turbojet nozzle and extensive wind tunnel tests have shown prop efficiencies as high as 80 per cent at supersonic speed.

Electronic Helicopter

Due to inherent instability, the helicopter is extremely difficult to operate at night or when the pilot has no visual reference from the ground. Intensive research and experiment with special flight instruments have greatly improved the safety of night helicopter operation during the past two years and they are regularly operated at night by the military services, although not yet in civilian services. The Air Navigation Development Board is expected to take a very long step towards bringing the helicopter to full all-weather operation capacity this summer. A Marine Corps Sikorsky HRS-1 (S-55) is being equipped with complete instrument landing system receivers, Omni-Range receiver, distance measurement equipment, radio altimeter and automatic direction finder units, and operated over a simulated short airline in the Northern Virginia area. With this equipment, together with recently-developed flight instruments, the ANDB expects to develop operational experience that will permit use

(Turn to page 217, please)





One of the world's foremost designer-producers of tube mills, tube drawbenches, and tube cut-up equipment . . . serving the automotive fabricating and steel industries. If your business is tubing, McKay should be high on your list of standard and special equipment suppliers.

The MCKAY MACHINE Company



SEEDRG



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SPECIFY: No. 1000H CLEARPRINT—The Universally Accepted Tracing Paper.
No. 1025 PAPERCLOTH—The Paper with Cloth Durability.
Clearprint is available in widths from 24" to 54".
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is BELIEVING!

See for yourself why leading engineers and architects from Coast-to-Coast are demanding Clearprint Technical Papers. Ask for a sample, then make this convincing test:

- INVITES THE PENCIL Try Clearprint's perfect working surface with a 2H pencil, then with a ruling pen. Lines are sharp and clean - no feathery edges.
- NO GHOSTING Erase some of the lines. Redraw and erase several of them time and again. Crease the paper, too. Then hold it to the light, or make cleanest possible reproductions.
- 3. NEVER CHANGES—Sheets in use for 19 years prove Clearprint's amazing stability. Its strength, transparency and printing qualities remain unchanged after extended exposure to age, atmosphere, heat and light.

If you are not using Clearprint now, please make this comparative test on the paper you are using.

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THERE IS NO SUBSTITUTE - Domand Watermarked Clearprint

Available for stainless and sheet steel, die-castings and plastics

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Thousands of users know FITZGERALD

Metallic Aluminum-Fused-Oxide Steel Asbestos

GASKETS
end costly
gasket failures

Specially designed, ruggedly built, to give a lasting, perfect seal in high compression engines, gasoline or diesel.

There's a Fitzgerald Gasket for Every Engine

Grease Retainers

Cork Gaskets

FITZ-Rite Treated Fiber Gaskets for oil, gasoline and water connections



ROBERT COS. "COS.

MANUFACTURING CO.
Torrington, Connecticut

FITZ ERALD

AIRBRIEFS

(Continued from page 214)

of the helicopter in any weather flyable with fixed-wing aircraft. This is one of the most forward-looking and immediately-practical projects the ANDB has ever sponsored, usually confining itself to long-range research projects.

New Aircraft Battery

The Navy has long sought a method of protecting its aircraft batteries from the boiling or spilling of electrolyte with its attendent dangers and has announced the switch to nickel-cadmium batteries in its jet fighters. These batteries are sealed in stainless steel cases which is permissible due to the fact that the nickel-cadmium units use a non-corrosive alkaline fluid as an electrolyte which produces no gases. The batteries are being produced initially in France by Societe Accumulateurs Dixes et de Traction, which probably has more nickel-cadmium battery know-how than anyone else in the world. The batteries presently cost about \$500 each but quantity production is expected to reduce this high cost appreciably. The nickel-cadmium idea is not new, the battery having been used by the Germans on their World War II fighters and by the Sewdish Air Force, which still uses them. U.S. attempts to copy the batteries, even under Government develop contract, have resulted in fail-

BOOKS . . .

PROCEEDINGS OF THE FIRST U. S. NATIONAL CONGRESS OF APPLIED MECHANICS, published by The American Society of Mechanical Engineers, 29 West 39th St., New York 18, N. Y. Price, \$20.00. This is an up-to-date treatise on important advances made in the following branches of applied mechanics: elasticity, photoelasticity, plates and shells, creep, fatigue, buckling, dynamics, vibrations, fluid flow, thermal stresses, and aerody-namics. Sponsored by a Committee on Theoretical and Applied Mechanics which represented national engineering societies and colleges, and which was held in June, 1951, the Conference brought together most of the recognized authorities for a discussion of many of the most significant problems encountered in modern applied mechanics. Their findings are presented in the 135 papers published in the 1000-pages of these proceedings.



Zagar presents a new outlook on machines built for single, long production runs. A machine equipped with Zagar Gearless Drillheads and Hydraulic Feeder Units has use long after completing the job it was built for. Each gearless drillhead and each feeder unit on Zagar "Specials" is complete in itself. Any one or all of them can be removed and remounted in any sequence to produce on other production jobs. Standard Zagar Drillheads are adaptable to standard drill presses or special machines of your own make. Write us for detailed information on the basic equipment used in Zagar Special Drilling Machines.

Write for Engineering Manual "U-5" for more information on all Zaqar's tools for industry.

ZAGAR TOOL, INC.

24000 LAKELAND BLVD. . CLEVELAND 23, OHIO



TOOLS FOR INDUSTRY



Shaped Wire*

─ Flat● Round▼ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

Armature Banding Wire

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

Lock Safety Wire

Tough, durable, workable.

In the size and type for your work.

Spring Wire

Any shape*...high carbon... hard drawn...high tensile... stainless...galvanized... tinned...bright.

*Cross-sectional areas up to .250" square; widths to ¾"; width-to-thickness ratio not exceeding 6 to 1.

YOU do this-

Give us the specifications of the wire you need—or tell us details of job to be done.

WE'LL do this-

Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

Wire or Write Today PAGE WIRE

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

Industry News

(Continued from page 24)

Federal-Fawick Merger with Orange Abandoned

A proposed merger between Federal-Fawick Corp. and Orange Roller Bearing Co., Inc. of Newark has been abandoned. Fawick directors decided against the move even though stockholders had approved it, on the basis that consummation of a merger would not be in the best interests of the corporation. Orange stockholders tabled the resolution providing for the merger. Under the proposal Orange would have been merged into the Cleveland corporation through an exchange of stock.

Two P&A Warehouses

Construction of a new Studebaker parts and accessories warehouse in Kansas City, Mo., will begin this month. It will open about Aug. 1, to serve dealers in Kansas, western Missouri, northern Oklahoma, southern Iowa and the eastern half of Nebraska.

Nash Motors has established a new parts and accessories warehouse in Brooklyn, O., to serve its dealers in the Pittsburgh, Cleveland and Buffalo zones.

Located on the outskirts of Cleveland, the new warehouse and offices cover approximately 66,000 sq ft of floor area. The building also will house the Nash Cleveland zone offices.

Cessna Orders Up

Some \$7 million of additional subcontract work was received last month by Cessna Aircraft Co. from the Lockheed Aircraft Corp. for the purpose of continuing production of component parts for the T-33 jet trainer. Additional subcontract work in the amount of \$10 million was received from the Boeing Airplane Co. for extension of work on the Boeing B-47.

Canada Ford Net Up

Ford Motor Co. of Canada reported net earnings for 1952 of \$15,342,920. This is equal to \$9.25 a share and compares with a net of \$14,884,848 or \$8.97 a share in the preceding year. The company's annual report disclosed that vehicle production set new records last year. Assemblies last year numbered 132,190 units, topping the preceding year's high mark by 13,334 vehicles. Dollar sales totaled \$267,683,969 compared with \$253,008,356 in 1951.

(Turn to page 220, please)

650° F. STEADY OR WITH RAPID FLUCTUATIONS MYCALEX INSULATION CAN TAKE BOTH OF THOSE TEMPERATURE CONDITIONS

It holds inserts tightly, and moves with the metals around it, because it has very nearly the same coefficient of thermal expansion as the most important metals of which inserts and casings are made.

DESIGNER! UNCHAIN YOUR IMAGINATION!

The destructive effects of high operating temperatures, high ambient temperatures, thermal expansion as between metals and insulations, have caused you to make too many items too much bigger and heavier than they need to be.

MYCALEX glass-bonded mica also is dimensionally stable, corona resistant, does not carbonize under arc, has no moisture absorption.



THERE ARE PLENTY OF OTHER USEFUL FEATURES . . . WRITE for the whole story



MYCALEX CORPORATION of AMERICA

World's Largest Manufacturer of Glass-bonded Mica Products Executive Offices: 30 Rockefeller Plaza, New York 20, N.Y. GENERAL OFFICES AND PLANT

119 CLIFTON BOULEYARD, CLIFTON, N.J.

WIRE WHEEL DISKS



designed..._





Exclusive, custom-styled wire wheel disks,
offered as optional and accessory
equipment by several of the country's leading
automobile manufacturers are just one of
many mass produced and stamped
automotive parts created by the
A. S. Campbell Company Inc.

Creation of custom-styled automotive parts coupled with extensive facilities for volume production enables Campbell to closely work with leading automobile manufacturers in producing economical new designs.

With our new expanded design and sales offices at 10124 W. McNichols Road, in Detroit, Michigan, we are now better equipped to serve your every need in chrome plated automotive stampings and trim.



A. S. CAMPBELL COMPANY, INC.





or Released in an Instant



Faster assembly . . . no more failures of fasteners. GREER STOP NUTS hold firm against jolts, shocks, shimmy, wobbles . . . any vibration, any kind.

Bolt threads are gripped



tightly . . . these famous nuts never work loose. Yet an ordinary hand wrench gives instant release. The tough, built-in GREERCOID collar does it . . . and seals against fluid leakage, too!



Study your fastener problem. Over 3000 types and sizes. Consult GREER. Proved on thousands of products. Meets gov't and military specifica-





Industry News

(Continued from page 218)

Many Expansions Planned for West Coast

With the purchase late in 1951 of the steel service plant of the former Inland Empire Steel Company, North 207 Freya St., Spokane, Wash., by Joseph T. Ryerson & Son., Inc., a spokesman for Ryerson said that it was looking forward to expanding the steel service facilities at this plant.

Details of the first expansion move have been disclosed by C. L. Hardy, president, who said that work had begun on a new span which will permit the addition of reinforcing bar fabricating operations to the company's service on other types of steel. Approximately 10,000 sq ft of working space will be made available for this purpose. The new reinforcing bar facilities are expected to be ready for operation within the near future. R. M. Bialkowsky, former manager of Inland Empire Steel, is Ryerson plant manager at Spokane.

Lockheed Aircraft Corp. has awarded contracts for approximately \$3.2 million for the construction of three factory buildings at the new USAF jet test center, Palmdale, Calif. Construction is scheduled for completion in about ten months. The new structures will include a 180 x 340 ft final assembly building, a 150 x 675 ft production flight hangar and an 82 x 160 ft maintenance and service building. Manufacturing and flight facilities at Palmdale will be shared by Lockheed, North American Aviation and Northrop Aircraft.

Northrop Aircraft, Inc., will begin construction this month on new flight testing facilities at Palmdale Airport, California. Total cost of the facilities will be more than \$2.5 million and completion of the project is expected by Jan. 1, 1954, according to company officials. The 250,000 sq ft of buildings will provide peak employment for about 700 persons, Northrop reports.

Minneapolis - Honeywell Regulator Co. has announced plans to erect a new plant on a 16-acre site at Gardena (Los Angeles area), Calif. Employment of 2000 persons is expected by the company.

Pastushin Industries, Inc., has moved to a new plant as the latest step in an extensive program to expand production of aircraft hardware including aircraft rivets. Located at 501 North Prairie Ave., Hawthorne, Calif., the new 5000 sq ft factory unit

(Turn to page 222, please)



the head that's ahead in every way . . .

This new "Serv-Rite" thermocouple head is actually small enough to be held comfortably in the palm of your hand. But size is only one of the many features that make this thermocouple head really extraordinary. It is loaded with installation and service conveniences that any user of thermocouples will appreciate at once.

The body is of malleable iron, cadmium plated for durability. A new type friction lock assures easy removal or tightening of the cap — a quarter turn does it. An asbestos gasket makes the head dirt- and moisture-proof. With a choice of 1/2", 3/4", or 1" IPS opening for the protecting tube, you can standardize on one style head.

The connector block is of a material especially selected to withstand, without damage, temperatures up to 900° F. in continuous service. Improvements over the conventional type of inserts greatly simplify the making of the lead wire connections. The complete thermocouple element, including connector block, can be easily withdrawn for inspection.

Install a "Serv-Rite" thermocouple head and see for yourself how much better it really is.

Write for complete details

GORDON

CLAUD S. GORDON CO.

Manufacturers · Engineers · Distributors Thermocouples & Accessories • Temperature Control Instruments • Industrial Furnaces & Ovens Instruments • Industrial Furnaces a Metallurgical Testing Machines

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SIMPLICITY in hydraulic pump design is important for these reasons:

The Pesco hydraulic pump is a gear design—the simplest of all hydraulic pumps. There are actually only three moving parts in the pump proper. Fewer moving parts mean—

- ... less chance of pump malfunction
- . . . less maintenance
- ... less cost for overhaul
- . . . less weight
- . . . less noise

which makes possible:

"Pressure Loading" is Pesco's exclusive development that automatically holds end clearance of gears to a thin film of oil, thereby maintaining the volumetric efficiency throughout the long service life of the pump.

. . . volumetric efficiencies up to 97% over a wide range of temperatures

which assures:

... uniform high quality and performance of each pump
... a longer, trouble-free service life

Simplicity of design, efficiency of "Pressure Loading" and statistical quality control in all phases of manufacture, are three important reasons why Pesco pumps are standard equipment on military and commercial aircraft and on many automotive and industrial products. Write today regarding your hydraulic pump requirements.



BORG - WARNER CORPORATION
24700 NORTH MILES ROAD BEDFORD, OHIO

Precision Quality STAINLESS SET SCREWS

18-8 and type 316 ...

IN STOCK

Stainless Steel Set Screws of all types, in all standard sizes, lengths, and points, in stock, ready for immediate shipment to you. What do you need? Socket Set? Slotted or Square Head Set? We have them. We can fill rush orders for them—and for Socket Head Cap Screws, Flat Head Socket Caps, and many other stainless fasteners. Specials made promptly.



Jamaica 2, N. Y.

Find out how many of your needs we can satisfy.

Write, on your letterhead, for our new, 96-page catalog No. 53X





91-46 Van Wyck Expressway

Industry News

(Continued from page 220)

is located near Hawthorne Municipal Airport.

A \$750,000 plant for the manufacture of chemical maintenance products for automobile, aircraft, home and industry will be erected in Sunnyvale, Calif., in the immediate future by the R. M. Hollingshead Corp.

Construction of the multi-story plant will begin immediately and is scheduled for completion early in 1954. The new factory, with additional facilities provided for offices, warehousing and shipping, will produce most of the company's chemical requirements for the 11 Western States.

New Mult-A-Frame Plant

Increased demand for Mult-A-Frame, the new fully-locking steel framing material, from industry, architects, and contractors, has outstripped its original manufacturing facilities, according to Ainsworth Manufacturing Corp. The firm has transferred the sales and manufacturing operation to a new Detroit plant at 1471 E. Atwater St., equipped with the latest type rolling mills, automatic conveyor type rust-proofing and enameling equipment, presses, and other equipment for production of Mult-A-Frame in large volume. The division, under the direction of M. M. Roberts, manager, has established authorized distributors in all major cities.

ICEI Elects

R. C. Wietersen, director of purchases of the Buda Co. has been elected president of the Internal Combustion Engine Institute. Other officers elected at the Institute's annual meeting were: vice-president, J. E. Heuser, sales manager—Engine Div., Le Roi Co.; secretary, R. H. Kerr, chief engineer, Climax Engine and Pump Manufacturing Co., and treasurer, J. D. Cook, secretary and treasurer, Hercules Motor Corp.

Paint Spray Movie

A new 25 minute, 16-mm, colorsound film explains the Ransburg No. 2 process of electrostatic painting and shows many production line applications. Available upon request to the Ransburg Electro-Coating Corp., Barth & Sanders Aves., Indianapolis 7, Ind., this movie is recommended to those interested in factory production line painting operations.

If your problem in

Custom Molded Rubber Parts

- is extreme temperature, or atmospheric conditions
- or is service with special fuels and lubricants
- or is service with acids and greases
- or is exacting tolerance specifications

CALL THE PARKER RUBBER ENGINEER



Meeting your requirements for molded rubber parts is a PARKER specialty. Answering your problems is a challenge to the PARKER Rubber Engineer.

If rubber parts must give long and trouble-free service under very difficult operating conditions, PARKER's research and experience may hold the moneysaving answer for you - as it has for many PARKER customers in automotive, electrical equipment and other industries.

EXCLUSIVE NEW TECHNIQUES-Newly perfected highproduction processes and molding methods mean lower cost and greater value in finest custom molded rubber parts. Investigate this PARKER service; mail the coupon today!



FOR EXAMPLE:

This RADAR SCREENER PAD, (approx. 134" long), molded from a fuel-resistant compound, presented an intricate molding problem because of the difficulty of removing the part from the mold.

This GRAIN SPACER (approx. 6" in dia.), a typical spacer gasket, which, through perfection of new cost-saving methods and processes, can be produced in large volume in a relatively short time.



This RADAR GROMMET (approx. 1%" wide), involving a complicated molding problem, but which, again thanks to newly perfected techniques, is handled to the customer's complete satisfaction from both a time and price standpoint.



THE PARKER APPLIANCE COMPANY 17325 EUCLID AVENUE . CLEVELAND 12, OHIO

The PARKER Applie	educts Division ance Company
17325 Euclid Aven	ue, Cleveland 12, Ohio
Please send info	rmation on Custom Molded Rubber Parts.
☐ Please have PAI	KER Rubber Engineer call on me.
INDIVIDUAL	
COMPANY.	
ADDRESS.	N. C.

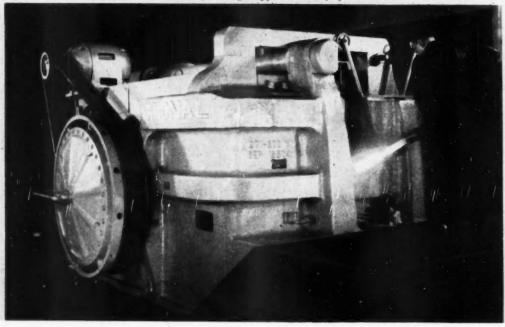
The SURE Way

YOU can get into production quickly on high explosive shells if you use the tried and proved (1) National-pioneered progressive piercing method and (2) National forging machines—the right method and the right machine.

All operations are done on one machine, on one heat, by a single operator with no special skills. The result is a forging having a cavity finished to size and possessing excellent concentricity. Only minimum machining is required on the shell exterior.

A high production rate is attainable from the beginning, without multiple-stage operations involving excessive handling, annealing and coating, and without the need for scarce steels.

This 4" High Duty Forging Machine, tooled to forge the 75 mm. high explosive shell, is one of the many NATIONALS which are being shipped these days for shell work.



to Forge Shells!

ΠΠΠΠΠΩΩή

Here are a few shell forgings produced on National High Duty Forging Machines in dies .
designed by National engineers.

Rugged, dependable National High Duty Forging Machines are designed for the exacting demands of shell work. The NATIONAL'S basic rigidity is vital for accurate die match. The exclusive diaphragm clutch insures round-the-clock trouble-free operation, year-in and year-out.

National engineers, with years of experience in all phases of shell forging, have tooled hundreds of High Duty Forging Machines for all types of deeppierced ordnance jobs.

Whatever your problems, our forging engineering is at your disposal. Send us a print or sample of your jobs, or, better yet, pay us a visit, without obligation.



Shell forgers get assistance with their problems by working with National engineers.

NATIONAL MACHINERY COMPANY TIFFIN, OHIO—SINCE 1874

DESIGNERS AND DUILDERS OF MODERN FORGING MACHINES . MAXIPRESSES . REDUCEROLLS . COLD HEADERS . BOLTMAKERS . NUT FORMERS . TAPPERS . NAILMAKERS

Hartford

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Chicago

Potentialities of Automation Discussed at Conveyor Meeting

Potentialities of automation are much greater than is generally realized, L. E. Doyle, University of Illinois mechanical engineer, declared at the Conveyor Institute jointly sponsored by the University and the Conveyor Equipment Manufacturers Association April 16 at Champaign-Urbana. More than 275 engineers from 15 states attended the conference.

Largely untouched by the new principle, according to Mr. Doyle, are the industries where rates of production are relatively low and where 75 per cent of all manufacturing is done.

"Look for the development of many flexible machines that will perform varied sequences in response to easily prepared instructions on cards, paper tape, magnetic tape or film," Mr. Doyle said. "Here in many cases is an answer to metal product production in lots of 50 or less. Next will come integration of automatic machines for different processes and full automation of a plant."

"This new word should include the automatic handling not only of parts in process but also supplies and scrap," he said. "It might also be extended to the automatic handling of materials before and after processing, as well as in process.

"Broader concepts of the term embrace the integrated automatic operation of machines and process equipment in addition to the material handling aspects. In this sense, the automatic control of processes and operations is the core of automation."

Wrong words for machines and parts cost American industry millions of dollars a year and lead to Towerof-Babel confusion, Harry C. Davis. President of the Association, declared at the Conveyor Institute.

-To provide the right word each engineer was given a dictionary of more than 1500 conveyor terms and definitions agreed upon as standardized terminology by the members of the conveyor association. Principal terms are also given in German, French. and Spanish to help prevent confusion in orders from foreign countries.

"In defense contracts we have frequently seen as many as five different terms used for the same equipment, and in many instances the same term meant five different things to different companies," Mr. Davis said. "There has been confusing inconsistency without rhyme or reason."

Jervis C. Webb, Detroit conveyor manufacturer, emphasized the potentialities of automation in smaller plants. He said that automation is complex but the units are usually small and capital required is often less than for non-automatic equipment. He said that it will favor high specialization in quantity production of single items, such as parts manufacture for sale to large assemblers.

The sessions revealed that many production engineers throughout industry are concerned about the problem of selling policy executives on the advantages of new and improved equipment. "Top Brass" which is not familiar with technical details fails to appreciate money-making opportunities that are obvious to engineers and shop men. This led to the conclusion that salesmanship is an essential to successful engineering, because every engineer has an internal sales



Burton AUTO SPRING CORP. Chicago 32, Illinois

Pressur-Forming

ASSURES A BETTER FIT, GREATER STRENGTH, LONGER LIFE

ALLEN'S specialized and perfected method of cold forging Allenoy steel produces the tremendous strength, fatigue resistance and precision that made Allen the Number One name in socket screws. Full "pressur-forming" preserves the tough Allenoy fibers continuous, uncut and concentrated where strength is needed most . . . conforming to the contours of screw head, socket and threads.

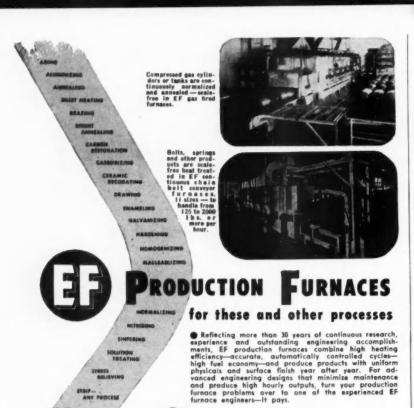
ALLEN PRESSUR-FORMING pays off in precision screws that you can count on to speed assembly, stand up better under continued hard usage. To be sure you get the advantage of "pressur-forming"—just remember to get genuine Allens, the easy name to remember because Allen stands for socket screws. The leading

Industrial Distributor in your area stocks

a complete line.

ALLEN

Allen 'pressur-formd' cap screws are standard stock items in sizes from No. 4 thru 1 in. Flat head cap screws, No. 4 thru 34 in. Both N. C. threads. Many sizes are also standard in stainless steel, or in Allenoy steel with N. F. threads.



THE ELECTRIC FURNACE CO.



job to do within his own company, even if he has no direct contact with the company's customers.

J. M. Alvey, St. Louis conveyor manufacturer, said that one of the first requirements is for the engineer to learn the language of cost analysis, because this is the language of the top executives who control the purse strings.

MEN in the NEWS

(Continued from page 25)

Udylite Corp.—Clyde H. Reeme was raised to president with the elevation of L. K. Lindahl to chairman. L. V. Nagle was promoted to executive vice-president, and A. L. Barak replaces Reeme as treasurer.

Pastushin Aviation Corp.—Joe Horton has been appointed superintendent of plant No. 3, Hawthorne, Calif.

North American Aviation, Inc.— J. J. Fluck recently was named general manager of the Fresno, Calif., plant.

Kennametal Inc.—Bennett Burgoon, Jr., is now sales manager of the Metal-Working Div.

U. S. Rubber Co.—John F. Arthur recently became U. S. truck tire sales manager.

American Brake Shoe Co. — N. George Belury, president of the Engineered Castings Div., was elected a company vice-president.

Aviation Products Div., Goodyear—C. A. Huslemann has been named manager of the landing gear department, succeeding J. E. Leonard, who has joined Cessna Aircraft Co.

Fairbanks, Morse & Co.—J. E. Mc-Quilkin has moved to assistant to the president of the Canadian Fairbanks-Morse Co., Ltd. Frank M. Mason, Jr., is now coordinator of U. S. Government business. J. F. Weiffenbach has been named chief product engineer of the manufacturing division. W. E. Watson has been assigned works manager of Canadian Locomotive Co., Ltd.

Carborundum Co. — Herbert P. Dales has been appointed sales manager, and Carl L. Adelman assistant sales manager, of the coated products division.

standard Air Blast

20th Century

IF you're working on the production cost angle, consider the 20th Century triangle . . . abrasive toughness, economy, longer wear and highly uniform quality.

20th Century grit, the Persuasive Abrasive, is answering the problem of cost in thousands of foundries and metal-working plants everywhere.

May we hear from you? Our new catalog will give you more details.

THE CLEVELAND

Metal Abrasive

CO.

807 East 67th Street, Cleveland 8, Ohio Howell Works: Howell, Michigan

One of the world's largest producers of quality shot, grit and powder — Hard Iron — *Normalized — Cut Wire — Cast Steel

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equipment has a record for

DEPENDABILITY

Today K-S automotive gauges and speedometers are standard equipment on 17 makes of passenger cars, trucks and buses—about 30% of this country's production. And the majority of these vehicle manufacturers have used K-S equipment for 15 years or more—some for more than 20 years.

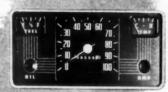
This widespread acceptance of K-S products is the result of progressive engineering and precision manufacturing—K-S know-how. The continued use of K-S products for such long periods definitely indicates performance that is consistently satisfactory.

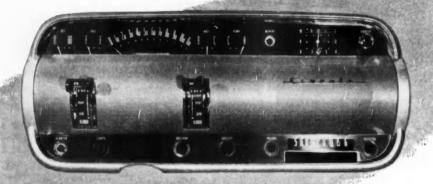
When you standardize on K-S automobile gauges, speedometers and instrument clusters, you offer your customers this same dependable performance.

KING-SEELEY CORPORATION

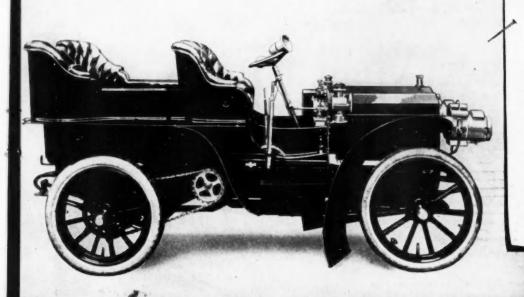
ANN ARBOR, MICHIGAN

Plants at ANN ARBOR, SCIO and YPSILANTI









Send for free print.

Chain-driven Napier, about 1902, featuring several batteries of lights; several batteries of instruments, exposed levers, and gauges; and a horn with a blast loud enough and sharp enough to cut through the worst London fogs.

This is one of a series of old automobile prints that will appear in future Morse advertisements. Write for your free, enlarged copy, suitable for framing for your collection.

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WE ET RANSMISSION
PRODUCTS

BILL

TOTAL

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If you need any information or advice on the use of timingchain drives, come to Morse.

If you need timing-chain drives which will give the owners of your cars, trucks, or buses long service life free of trouble and maintenance worries, come to Morse. Thirteen of today's cars use timing-chain drives. Eleven of the thirteen use Morse Timing Chain Drives as original equipment.

We'd like to show you, too, why M = TC; Morse means Timing Chains to the automotive industry.



ON THE 1953 MODELS THAN EVER BEFORE

• Year after year, the use of straight-chromium Type 430 Stainless Steel for interior and exterior trim has been increasing steadily. And it hits a new high on the 1953 models of almost every manufacturer.

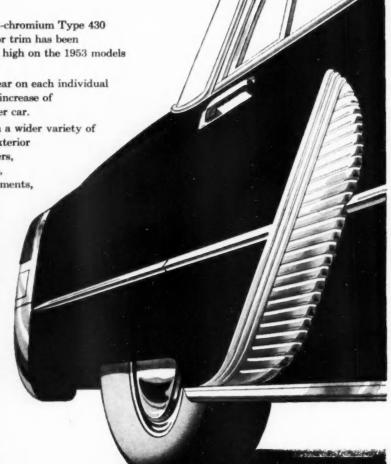
There's more Stainless Steel this year on each individual car . . . one manufacturer reports an increase of more than 25% in Stainless weight per car.

And Stainless Steel is being used in a wider variety of applications, including interior and exterior mouldings, glass channels, wheel covers, hub caps, lamp doors, radiator grilles, door handles, radiator and hood ornaments, stone shields and many more.

Stainless Steel trim is enthusiastically received by car buyers who recognize that its beauty is more than skin deep. Its lasting corrosion resistance and dense, durable surface keep it looking new a long time.

New finishing facilities have helped to speed this switch to Stainless Steel. U·S·S 17 (Type 430) Stainless Steel, used extensively for these applications, is furnished in strip form with a bright mill finish that requires minimum polishing after forming.

For the finest performance, insist on U·S·S 17 Stainless Steel. Our representatives will be glad to work with you in selection of materials and forming methods that best meet your design requirements.



UNITED STATES STEEL CORPORATION, PITTSBURGH . AMERICAN STEEL & WIRE DIVISION, CLEVELAND . COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
NATIONAL TUBE DIVISION, PITTSBURGH . TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. . UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S STAINLESS STEEL

SHEETS . STRIP . PLATES . BARS . BILLETS . PIPE TUBES . WIRE . SPECIAL SECTIONS



3-621

UNITED STATES STEEL

MOVE MATERIALS FAST...SAFELY...ECONOMICALLY

with Diamond Vulcanized Fibre ...

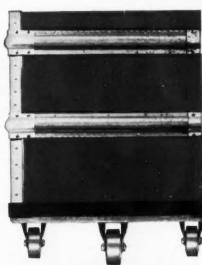
SPARTAN TRUCKS

You need less manpower, less effort, less time . . . to move materials from one department to another with Spartan trucks. They help increase production and profit! Really tough, the C-D-F Diamond Fibre sides are scuff-proof, last for years without maintenance. Sides stay smooth! They resist moisture, oil and grease! All-metal rim is one piece, channeled for extra strength, eliminates snagging of elbows and materials.

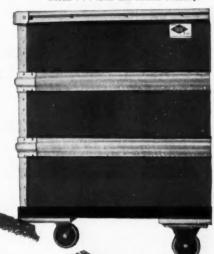
RECEPTACLES

C-D-F receptacles can be furnished in a variety of types, sizes, styles to meet specific requirements. Made from Diamond Vulcanized Fibre, receptacles resist the hard knocks of everyday use; resist water, oil and grease. Smooth-surfaced fibre is bone-hard, does not crack or shatter. There's a lightweight—low cost—C-D-F Fibre receptacle for every industry.

C-D-F builds tough, sturdy tote and mill boxes that stack, saving space and ef-



KICK BAND is welded angle iron frame to protect sides of genuine hardwood bottom. A SPARTAN is light on its wheels . . . turns and swivels smoothly!



YOUR CHOICE OF CASTERS . . . Shown is a 4" diameter steel wheel, proven best on thousands of mill floors. Ball bearings with lubrication fitting. Close tolerance thread guard of heavy gauge metal keeps wheel spinning, clean and free. Other types of casters available: rubber composition; bakelite; iron; plain or roller bearing; swivel.



This C-D-F barrel of Diamond Vuccanized Fibre is light, easy to handle, easy to keep clear. Available with or without casters. Fibre or metal kick bands.

THE NAME TO REMEMBER . . . DIAMOND FIBRE RECEPTACLES

Write for Receptacles Catalog . . . call your C-D-F sales engineer. He's a good man to know.

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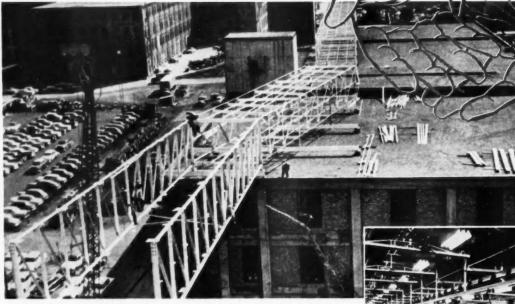
Rockford, Illinois



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Unit Drop Forge Division, Milwaukee 1, Wis. . WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

For cost-cutting solutions
place your conveying problems
in competent and experienced hands



An Anchor job. One of the largest installations of 1952. Shown here in an early stage of construction before enclosure. Transports automobile bodies ½ mile from 6th floor of body building to 3rd floor of assembly building. Total conveyor length 5500 feet.

▶ In over 25 years of service to industry, Anchor has brought new concepts to the field of automatic handling. Never content to be identified solely as a fabricator of conveyor equipment,

> Anchor men choose to analyze problems, explore the alternatives.

> As a consequence of this policy the "obvious" answer is frequently improved upon with important savings in both construction and operating costs. You can rest assured that when your conveyor job reaches the Anchor shop for fabrication, it has received the benefit of the best thinking in the conveyor industry.



Camprehensive 56 page catalog illustrates scores of installations. Deals with advantages of various methods and techniques. It belongs in your reference file. Write for copy.



Anchor standard de

sign Hinged Pan Conveyor. For quench

> Wood Slat Conveyor for assembly operations, or transporting material on the level or up and down inclines





OVERHEAD TROLLEY . MONORAIL . ROLLER CHAIN . DRAG CHAIN . FLOOR CHANNEL . PALLET . FLAT TOP . CROSS BAR . PLATFORM . SLAT
ROTARY TURRET . AUTOMATIC TRANSFER AND LOADING AND UNLOADING DEVICES . SPECIAL TURNTABLES . AUTOMATIC OVERLOAD CUT-OUTS

NUT RUNNING PROGRESS

The production progress shown at the left is from the records of a leading car manufacturer and was based upon 1000 units of comparable nut running operations.

It is significant that each advance in production efficiency has made possible increased wage rates . . . greater production requiring the employment of more men . . . and an improved product of greater value to the user. This steady improvement in tools resulting in increased labor productivity is in large measure responsible for our nations' superior standard of living.

1952

UNITS per hour

with hand wrench

per hour

UNITS

th single power wrench

per hour

with speeder wrench

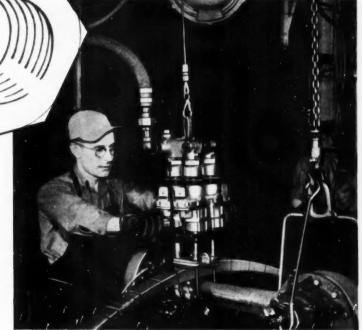
UNITS per hour

Ingersoll-Rand Multiple Nut Runner

MULTIPLE NUT RUNNERS

give you:

- 2 or more nuts driven at once . . . in the time formerly required to drive one.
- Good "quality control" . . . Torque is uniform on each and every nut.
- Safe Operation for operator . . . Torque reaction is non-existent.
- Immediate on-the-job operation . . . No special training needed for the operator.
- Low Maintenance . . . Units in service show maintenance savings up to 50%.



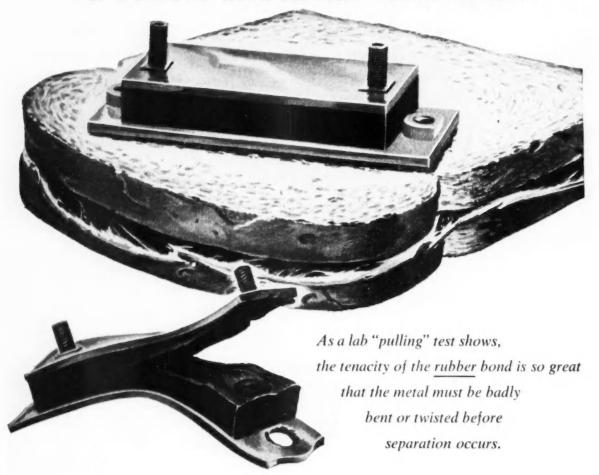
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Ingersoll-Rand

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This is a rubber-and-metal sandwich...



Note that the D-nuts were actually torn out by the testing machine! These rubber-tometal sandwiches, in a variety of designs and sizes, are made for the automotive industry at United States Rubber Company's great plant at Fort Wayne. They are just one example of the many different products available to you at this centrally located plant.

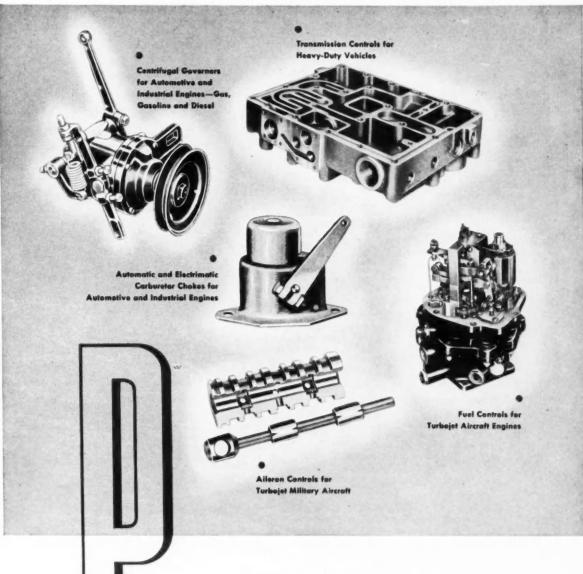
Just as important is the great "U.S." laboratory at Fort Wayne, where scientists and engineers are at work developing new ways to help your product operate more efficiently. And right on your doorstep, at New Center Bldg., 7430 Second Ave., Detroit 2, are the "U.S." sales engineers who act as liaison between you and Fort Wayne. Maybe "U.S." already has the answer to a problem of yours. In any event, "U.S." engineers will be happy to tackle it. They know their job, and they have all the help that modern science can give. Write to address below.



"U.S." Research perfects it "U.S." Production builds it

UNITED STATES RUBBER COMPANY

Automotive Sales, Mechanical Goods Division . New Center Bldg., Detroit 2, Michigan



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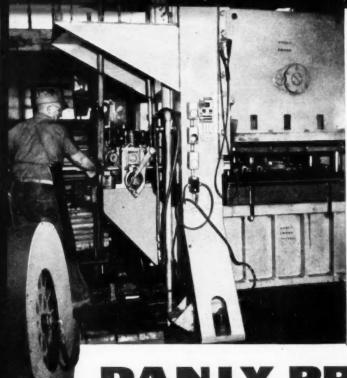
"WORLD'S MOST EXPERIENCED GOVERNOR MANUFACTURER"

stamping costs are going down!

DANLY CONVEYERIZED PIECE PART HANDLING Blanked and punched side bars, to-H 2 200 48 30 gether with scrap, drop through the press bed onto a divided conveyer and are carried to separate tubs as shown

COMPLETE OIL LUBRICATION —INCLUDING GIBS

Automatic oil lubrication of gibs permits extremely close alignment of slide and more accurate guiding of diesgreatly decreasing die wear. Clean filtered oil continuously supplied to all wear surfaces is only one of Danly's outstanding "preventive maintenance" features.



AUTOMATIC FEEDING

In this setup, alloy steel side bars \(\frac{\pi}{n} \) thick are blanked and punched in a multiple stage die at a high rate of speed. Dies like these last 200% longer in Danly Presses

DANLY PRESSES do it!

JEFFREY MANUFACTURING COMPANY REPORTS:

- 50% faster production
- 200% langer die life
- greatly decreased maintenance

The 200 ton Danly Autofeed Press shown here has been in continuous daily operation at the Jeffrey Manufacturing Company, Columbus, Ohio, for well over a year — without maintenance of any kind other than routine oil change. Steady performance like this and the faster stroking permitted by Danly's rigid, precise construction have raised average production of steel conveyor chain side bars from 3,000 per hour to 4,500 per hour.

Dies are lasting longer, too. In one case a 3-stage die required grinding every 10,000 pieces — now, in the Danly Autofeed Press, the same die turns out 30,000 pieces between grinds.

A story like this is typical of Danly Press performance in leading stamping plants throughout the country — and proof that Danly Presses reduce stamping costs!



MECHANICAL PRESSES ... 50 TO 3000 TONS
HYDRAULIC METALWORKING EQUIPMENT

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It costs less to run a DANLY PRESS!











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Autofeed

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Gap Frame

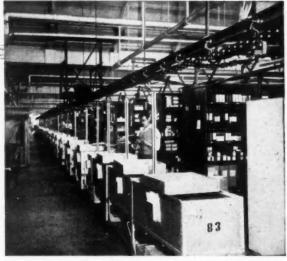
Double Action Straight Side

WEBB

Conveyors

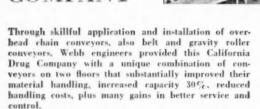
- ✓ Slash Handling Costs
- ✓ Increase Plant Capacity 30%
 - Eliminate Manual Handling

for



Large orders travel on trucks through order filling room to packers. Vertical rod on truck engages and disengages conveyor chain automatically.

CALIFORNIA DRUG COMPANY

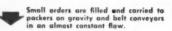


Complete conveyorization, based on sound engineering principles, is the secret of this successful improvement of operation. From the writing of orders (which

are carried on a belt conveyor to the scheduling desk) to the packing and storage of filled orders, conveyors eliminate unnecessary manual handling.

One of the unique features of this conveyor system is the manner in which trucks automatically engage or are disengaged from overhead trolley type chain conveyors. On the front end of each truck is mounted a mast having a movable rod. This rod can be placed in either engage or disengage position by operation of a treadle at the bottom of the mast. Trucks are automatically disengaged when the treadle contacts the truck ahead.

With this arrangement, personnel keep complete control of all trucks on the conveyor and orders are kept in rotation. Reported results are a smoother operation following a regular path, where blocked aisles, backtracking and confused routing are never experienced.





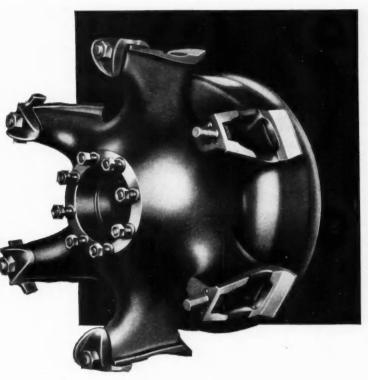
Belt and roller conveyors deliver all orders from packing areas to weighing station and then to shipping dock.

Conveyor Engineers and Manufacturers

Send for fully illustrated catalog that provides complete information on Webb conveyors



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There are two important reasons why Gunite truck and trailer wheels provide dependable heavy-duty service... while assuring minimum unsprung weight. One is the metal... precisely controlled castings are used to make Gunite wheels strong and rigid... ready to withstand the toughest road abuse. The other is Gunite's tubular spoke design... which creates maximum strength through accurate weight distribution • Gunite tubular-spoke wheels are rugged... yet, save vital pounds... cut per mile operating costs. Six low-torque floating rim bolts eliminate servicing headaches. Specify Gunite lightweight cast-steel wheels for your rigs.

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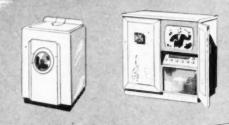
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Sleeve bearings in a wide variety of designs and sizes; cast bronze bushings; rolled split-type bushings; bimetal rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.

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You know how essential the right fasteners are to your product. They must be dependable, economical, properly designed and rigidly manufactured to measure up to your own product standards.

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And, when you need a special fastener... there's no problem either when you call on National. For more than 60 years, our reputation has grown and our facilities have expanded... because we have been able to answer industry's need for an endless variety of specially engineered headed and threaded products.

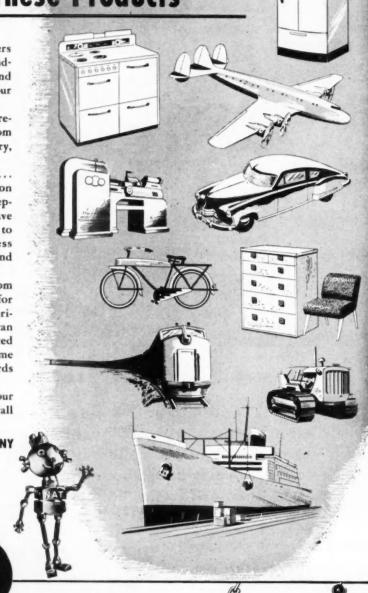
With some 3500 producing units, from cold-heading equipment to many types for secondary operation, we offer you experience and facilities second to none. We can tell you how your part can be produced economically and speedily...in the volume you need... and to the National standards of quality.

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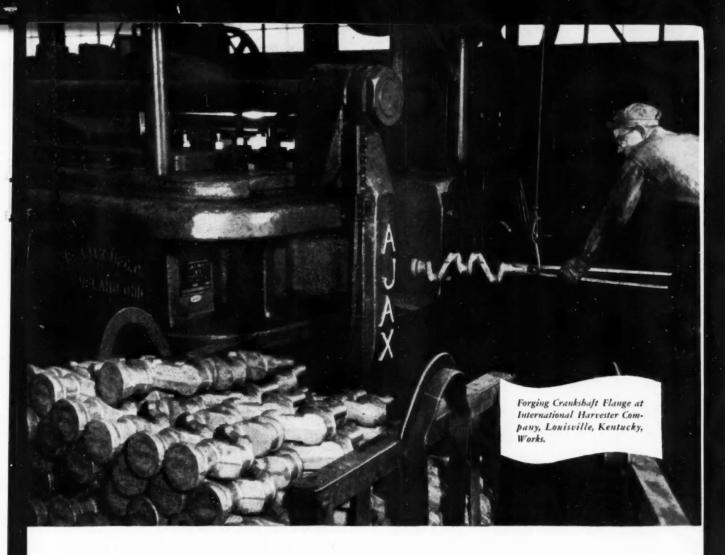




FASTENERS () HODELL CHAINS

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* Another job for the AJAX Upsetter

In forge shops all over the world, AJAX Upsetting Forging Machines are being chosen as the best piece of hot metal working machinery for a wide variety of jobs in diversified fields of forging. Some forge shop operators favor AJAX Upsetters because of the steady production flow from these air clutch operated machines. Other shop operators may choose the AJAX because the greater rigidity and more accurate align-

ment provide better filling of the die impressions with a minimum of flash. While still others may be thinking of the saving of the wear and tear on manpower due to the ease of operation.

With all of these important advantages and economies, it is very natural that Ajax Forging Machines continuously maintain a high percentage of productive time.

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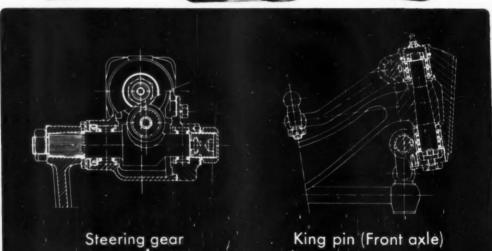
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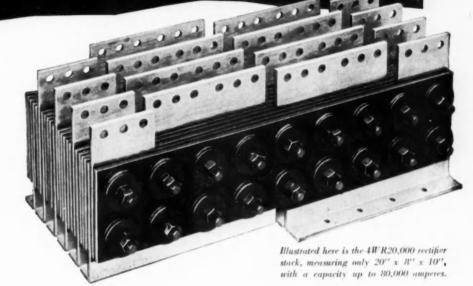
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RUEIL-MALMAISON (S.O.) FRANCE

ACTA

Thousands of amps for three-phase DC resistance welders... from MALLORY rectifier stacks



Supplying heavy DC welding currents for three-phase resistance welding machines—up to 80,000 amperes—is no small problem. It was solved by Mallory magnesium-copper-sulphide rectifier stacks, specifically designed for this application. Due to the exceptionally high current capacity of these rectifier stacks, the complete power pack—both transformers and rectifier stacks—is so small that the complete assembly can be mounted in standard welding machines.

High operating temperatures and severe duty cycles make this a tough assignment . . . but Mallory rectifier stacks take these conditions in stride. They maintain their high efficiency, and roll up records of thousands of hours of service without down-time.

A unique property of Mallory rectifier stacks proves particularly valuable in welding applications. The stack is self-regulating; that is, it automatically adjusts itself to take care of changes in resistance of the work being welded. This characteristic simplifies adjustment of the welding controls.

Resistance welding is but one of the many varied applications for Mallory rectifier stacks. Their unusual qualities make them the ideal choice for battery chargers, electroplating and other uses where an efficient, completely dependable DC power supply is required. Many standard and special designs are available.

For complete technical information, write or call Mallory today.

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UNEXCELLED SPARE PARTS SERVICE—For years Elwell-Parker has promptly furnished 85% to 90% of all required replacements out of stock.

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SPECIAL ENGINEERING-E-P experience in designing "special" trucks or attachments for unusual load conditions is unmatched.

SUPERIOR QUALITY-is the main reason why Elwell-Parker customers are so satisfied. E-P trucks commonly give 15 to 20 years reliable service. "They are built to match the finest machinery in your plant."

GET THE FACTS-Write for this complete catalog. The Elwell-Parker Electric Co., 4116 St. Clair Ave., Cleveland 3, Ohio.





SEE THE NEW ELWELL-PARKER MODELS AT THE MATERIALS HANDLING SHOW

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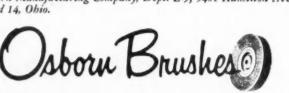
Gone ... costly thorns in their side

Burn removal by muscle methods is aggravating because it is costly, inefficient and non-uniform in quality. Here's how a truck manufacturer has banished these "thorns in the side" with push-button brushing.

The operation: to deburr, break and blend the flank edges of gear teeth prior to shaving and heat treating. Formerly done with a hand tool, in several operations, the work was tedious and required close inspection and reworking to meet rigid specifications.

Now, an Osborn Brushing Machine in one speedy operation smooths the entire tooth edge . . . produces uniform blending of surface junctures of every tooth. Result: lower costs and greater precision for better performance of the product in service.

Find out how you can cut your costs and improve your products with power brushing. Call the nearby Osborn Brushing Analyst or write The Osborn Manufacturing Company, Dept. E-5, 5401 Hamilton Avenue, Cleveland 14, Ohio.





AFTER deburring with Osborn Brushing Machine.

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

NATIONAL OIL SEAL LOGBOOK

Reprints from this or other Logbook pages are available for your files. Request them from our Redwood City, California office

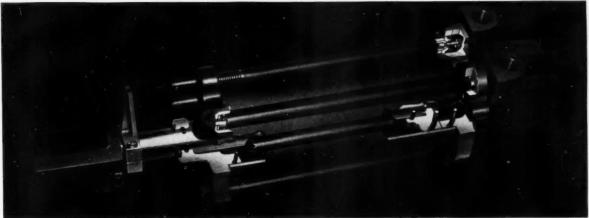


Figure 1. Bendix Depth Stop Cylinder

Ten O-Rings, Oil Seal solve pressure and dirt problems in compact Bendix Depth Stop Cylinder

The $3\frac{1}{2}$ " x 8" Depth Stop Cylinder is one of a line of cylinders manufactured by Bendix Pacific Division for the agricultural trade. Designed specifically for the operation of tractor-drawn tools, this cylinder has proven sufficiently rugged to be used for the operation of dozer blades, scrapers, etc. Operating conditions require sealing at ten points. Ten-O-Rings plus a rod wiper (oil seal) are used.

Bendix specifications provide that with the piston extended and 1,000 p.s.i. at one main port, there shall be no leakage at the opposite port. Also, with the poppet rod compressed and 300 p.s.i. at one port, leaks at the opposite port shall not exceed 7 c.c. in the last minute of a four-minute period.

This high order of sealing is achieved by the use of precision-made National O-Rings in both dynamic and static applications (Figure 1). O-Ring sizes vary from ½" to 3½" O.D. Dynamic applications are all of the reciprocating type, and S.A.E. \$10 oil is used in the system.

Where the piston rod passes through the cylinder head, a National 340,000 Syntech* oil seal is installed to exclude *Trade Mark Registered heavy concentrations of dirt, dust and mud. This seal has a synthetic rubber sealing member of springless design, bonded to a rigid steel inner member. The seal O.D. is also rubber covered to provide a positive seal against the cylinder head bore. (Figure 2)

National O-Rings and the seal used in this assembly are all standard units available without special engineering. National offers a complete line of quality O-Rings and over 2,500 standard-design oil seals. Whether your sealing problem requires special engineering or can be met with standard National sealing devices, National Applications Engineers are at your service. Call the nearest National office for information.



Figure 2. National 340,000 Syntech

Sealing News & Tips

National 30,000 series Seals

Have a heavyduty sealing problem involving lubricant retention and dirt exclusion? Investigate



National 30,000 series leather seals. Impregnated spring-loaded sealing lip retains grease or oil; tough springless outer wiper excludes foreign matter. Steel outer case press fits into bore or housing.

National O-Ring Catalog

Includes engineering, design and compound data, gland groove and back-up ring requirements, practical engineering suggestions. Lists all National O-Rings. Request free copy on letterhead, giving position or title.

"Let Your Decision be Based on Precision"



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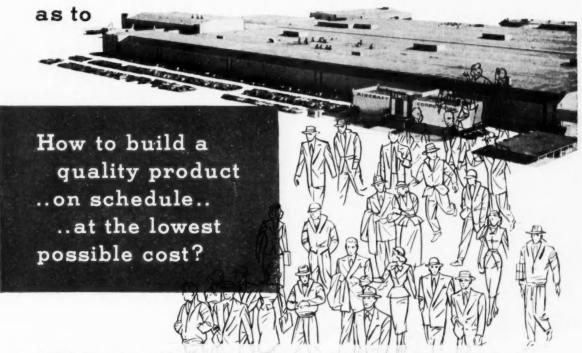
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FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS

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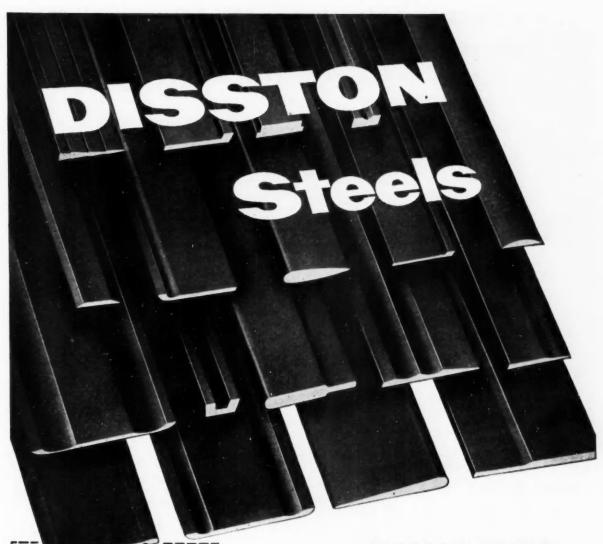


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SANBORN FOUR-CHANNEL **OSCILLOGRAPH** RECORDING SYSTEM

(MODEL 67)

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s shown in the diagram, removing or interchanging any of the amplifiers or other instruments is simply a matter of sliding the unit in or out of the mounting rack where contact is made automatically by plug-in connectors. Screws at the four corners of the panel hold the instrument in place.

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Sanborn Recording Systems may be used to record any one or more of a wide variety of phenomena whose characteristics range from static

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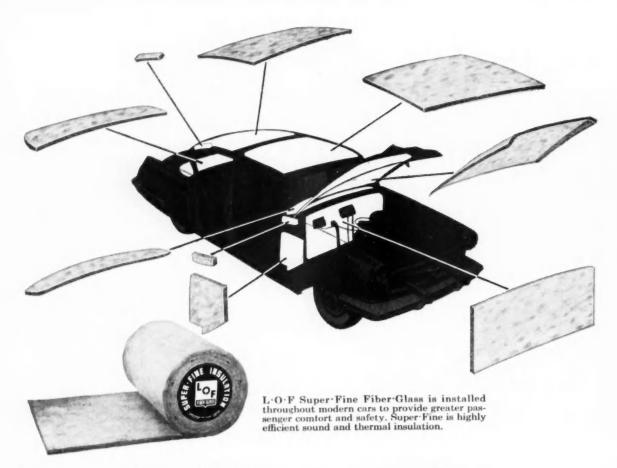
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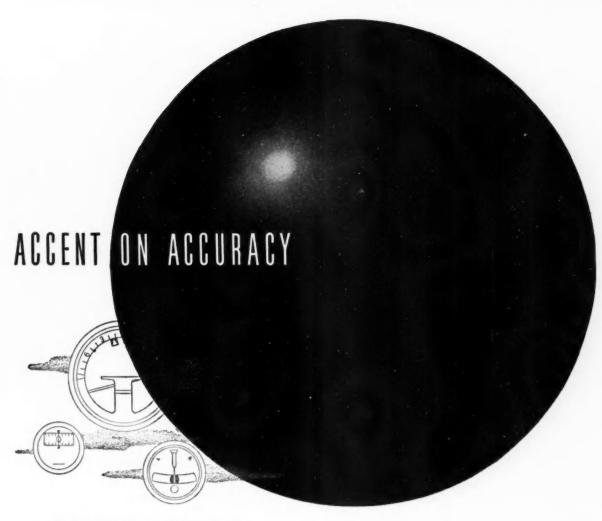
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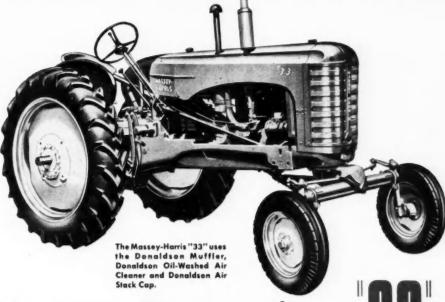
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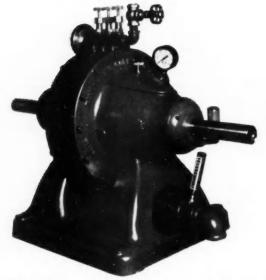


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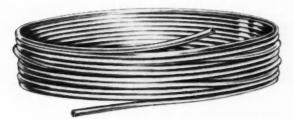
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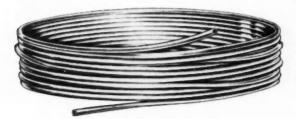
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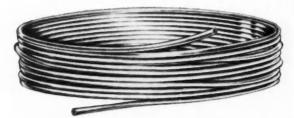


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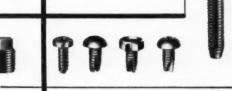


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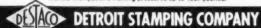
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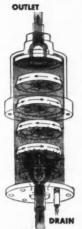
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